This document provides pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a major, municipal permit. The discharge results from the operation of a 54 MGD wastewater treatment plant. This permit action consists of updating the proposed effluent limits to reflect the current Virginia Water Quality Standards (effective 6 January 2011), updating permit language as appropriate and incorporating the authorization for reclamation and reuse of treated effluent as set forth in the Water Reclamation and Reuse Regulations at 9VAC25-740 et seq. The effluent limitations and special conditions contained within this permit will maintain the Water Quality Standards of 9VAC25-260 et seq.

1.	Facility Name and Mailing Address:	Alexandria Renew Enterprises Water Resources Recovery Facility 1500 Eisenhower Avenue Alexandria, VA 22314	SIC Code:	4952 WWTP
	Facility Location:	1500 Eisenhower Avenue Alexandria, VA 22314	City:	Alexandria
	Facility Contact Name:	Adrienne Fancher Chief Operating Officer	Telephone Number:	703-549-3381
	Facility Email Address:	Adrienne.Fancher@alexrenew.com		
2.	Permit No.:	VA0025160	Expiration Date:	31 May 2014
	Other VPDES Permits:	VAN010059 – Watershed General Permit		
	Other Permits:	Registration 70701 – DEQ-NRO Air Permit Permit Number 6300 – City of Hopewell, Indirect Wastewater Discharge (see Section 11)		
	E2/E3/E4 Status:	Extraordinary Environmental Enterprise (E4) Member		
3.	Owner Name:	City of Alexandria, Virginia, Sanitation Authority, d/b/a Alexandria Renew Enterprises		
	Owner Contact / Title:	Adrienne Fancher Chief Operating Officer	Telephone Number:	703-549-3381
	Owner Email Address:	Adrienne.Fancher@alexrenew.com		
4.	Application Complete Date:	15 November 2013		
	Permit Drafted By:	Douglas Frasier	Date Drafted:	8 May 2014
	Draft Permit Reviewed By:	Anna Westernik	Date Reviewed:	12 May 2014
	Draft Permit Reviewed By:	Alison Thompson	Date Reviewed:	27 May 2014
	Public Comment Period:	Start Date: 16 January 2015	End Date:	16 February 2015
5.	Receiving Waters Information:	See **Attachment 1** for the Flow Frequency Determination.		
	Receiving Stream Names:	Hunting Creek / Hooff Run	Stream Codes:	1aHUT / 1aHFF
	Drainage Area at Outfalls:	44.8 square miles / 1.3 square miles	River Miles:	0.57 / 0.15
	Stream Basin:	Potomac River	Subbasin:	Potomac River
	Section:	6	Stream Class:	II
	Special Standards:	b, y	Waterbody ID:	VAN-A13E
	7Q10 Low Flow:	Tidal	7Q10 High Flow:	Tidal
	1Q10 Low Flow:	Tidal	1Q10 High Flow:	Tidal
	30Q10 Low Flow:	Tidal	30Q10 High Flow:	Tidal
	Harmonic Mean Flow:	Tidal	30Q5 Flow:	Tidal

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

- ✓ State Water Control Law
- ✓ Clean Water Act
- ✓ VPDES Permit Regulation
- ✓ EPA NPDES Regulation
- ✓ Water Quality Standards
- ✓ 9VAC25-740 et seq. *Water Reclamation and Reuse Regulations*
- ✓ 9VAC25-415 et seq. *Policy for the Potomac River Embayments*
- ✓ 9VAC25-820 et seq. *General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*

7. **Licensed Operator Requirements:** Class I

8. **Reliability Class:** Class I

9. **Facility / Permit Characterization:**

___ Private	✓ Effluent Limited	✓ Possible Interstate Effect
___ Federal	✓ Water Quality Limited	___ Compliance Schedule
___ State	✓ Whole Effluent Toxicity Program	___ Interim Limits in Permit
✓ POTW	✓ Pretreatment Program	___ Interim Limits in Other Document
✓ eDMR Participant	✓ Total Maximum Daily Load (TMDL)	

10. **Wastewater Sources and Treatment Description:**

The Alexandria Renew Enterprises Water Resources Recovery Facility is a publicly owned treatment works with a design capacity flow of 54 MGD, serving a population of 315,000 in Fairfax County and the City of Alexandria. A portion of the collection system served, approximately 15%, includes a combined sewer system which is owned, operated and maintained by the City of Alexandria and is permitted separately from this facility (VA0087068).

Preliminary Treatment

Raw sewage entering the plant passes through two (2) 6 foot wide coarse screens to remove large debris. Screenings are disposed in dumpsters. Flow is then pumped to four (4), belt-type rotating fine screening units for further removal of trash and debris. The screenings are washed, compacted and disposed via landfill. After fine screening, flow enters a grit removal system consisting of four (4) vortex chambers to remove the heavy inorganic materials. The grit is washed, dewatered and disposed via either incineration or landfill.

Primary Treatment

The primary treatment units consist of eight (8) primary settling tanks to remove smaller solid materials. Grease, oils and other floating solids are removed by a skimming mechanism. Solids are removed as sludge and the effluent is pumped to the Biological Reactor Basins (BRBs).

Secondary Treatment

The Biological Nitrogen Removal (BNR) system consists of five (5) Biological Reactor Basins (BRBs) and six (6) secondary settling tanks. Each BRB has a volume of 4 million gallons and is divided into anoxic and aerobic zones. Aerobic zones are aerated by fine bubble air diffusers to facilitate microorganism activity to transform ammonia nitrogen to nitrate. The anoxic zones foster the growth of microorganisms that transform the nitrate to nitrogen gas, which is released into the atmosphere. The system has the flexibility to be operated either in parallel or in a step-feed mode. Methanol addition is available to further enhance the conversion of nitrogen compounds and thus, nitrogen removal.

A Nutrient Management Facility with a capacity of 18 MGD will be utilized to receive primary effluent flows during peak ammonia loadings; allowing the facility to return this flow during periods of low ammonia loading to optimize the BNR performance. This facility is estimated to be online April 2015 and is part of the ongoing nutrient upgrade.

The mixed liquor flows into the six (6) secondary settling tanks. These process units allow the microorganisms to settle. The settling process is aided by the addition of ferric chloride and/or polymer. The chemical addition at this point also enhances the removal of phosphorus. Solids are either returned to the reactor basins or are wasted to the solids handling system.

Tertiary Treatment

Effluent from the secondary settling tanks is pumped to the tertiary settling process units. This process consists of eight (8) tanks which are divided into a rapid mix tank, flocculation tank and plate settling tank. Flow enters the rapid mix tank where a coagulant (alum or ferric chloride) is added. Flow then passes through the flocculation tank where gentle mixing allows the suspended solids to form a cluster or floc. As the flow passes through the inclined plate settling tank, flocs settle by gravity; thus, removing suspended solids and additional phosphorus.

Flow is then routed to the filtration system. This process contains twenty-two (22) gravity sand filters. Further solids removal is achieved as the plant flow passes through the fine filter media. The filters are equipped with backwashing and air scouring systems that periodically remove the accumulated particles. The backwash is recycled back to an intermediate pump station within the plant.

Final Treatment

Final treatment of the flow is ultraviolet (UV) disinfection. The system consists of six (6) parallel channels with each channel containing two banks of low-pressure low-intensity UV lamps. UV light inactivates the various pathogens found in the effluent as it passes through the banks. Post-aeration is available to reintroduce air to the final effluent as necessary prior to discharge.

Alternative Final Treatment

Outfall 002 is a shore based concrete structure that serves as an emergency outfall if the UV system fails. Effluent discharging from this outfall would be disinfected using chlorination and dechlorination tablet feeders. There is no chlorine contact tank at this location; therefore, only water quality-based total residual chlorine limitations are applicable at this outfall. Discharges from this outfall would be to Hooff Run.

Stormwater Outfalls

Seven stormwater outfalls at the Alexandria Renew Enterprises facility were permitted under VPDES General Permit VAR051503. A site review was conducted by DEQ staff on 22 July 2014 and by letter dated 7 August 2014, DEQ approved the no-exposure certification for the facility. The General VPDES Permit for Discharges of Stormwater Associated with Industrial Activity was terminated on 8 August 2014. Consequently, these outfalls will now be recognized and authorized to discharge non-contaminated stormwater in this permit.

See **Attachment 2** for the no-exposure certification memo.
See **Attachment 3** for a facility schematic/diagram.

TABLE 1
OUTFALL DESCRIPTIONS

Number	Discharge Sources	Treatment	Design Flow	Latitude / Longitude
001	Domestic and Commercial Wastewater	See Section 10	54 MGD	38° 47′ 37″ 77° 03′ 26″
002	Domestic and Commercial Wastewater	See Section 10	54 MGD	38° 47′ 49″ 77° 03′ 36″
003	Non-contaminated stormwater	None	Not Applicable	Various
005				
007				
009				
011				
013				
015				
650	Level 1 Reclaimed Water – Internal Outfall	See Section 23	2 MGD	Not Applicable

See **Attachment 4** for the Alexandria topographic map.

11. Sludge Treatment and Disposal Methods:

Gravity Thickening

The gravity thickening system consists of five (5) circular tanks. This process unit receives primary and tertiary sludge. Thickened sludge is pumped to the sludge equalization tanks and the supernatant drains by gravity to the primary effluent pump station.

Mechanical Thickening

The mechanical thickening system consists of four (4) centrifuge trains. Waste activated sludge (WAS) is stored in the raw sludge blending tanks prior to being pumped to each of the centrifuges. Polymer addition aids in the liquid/solids separation process. Solids are then blended with the gravity thickened sludge, which is pumped to the pre-pasteurization facility.

Pre-Pasteurization

This process unit reduces pathogens by heating. The blended thickened sludge passes through two sludge screening presses and is then pumped through heat exchangers. The sludge is heated to a temperature of 158° F. The heated sludge is held in a holding tank at the target temperature for at least 30 minutes. Sludge is then cooled and sent to the digesters.

Digestion

The digestion system consists of four (4) anaerobic digesters. Digestion reduces the pathogenic organisms, reduces the mass of solids and produces methane gas which can be utilized for mixing and for fuel. Sludge is maintained at a temperature of 95° F for mesophilic anaerobic digestion. After digestion, the sludge is pumped to an equalization tank.

Centrifuge Dewatering

The facility has three (3) centrifuge trains used to convert the digested sludge into a dewatered sludge cake. Polymer addition occurs to aid the liquid (centrate)/solid separation. The high strength ammonia centrate is further treated in the Centrate Pretreatment (CPT) facility to reduce nitrogen loading to the BNR system.

Storage and Handling

The biosolids storage and handling system consists of a lime stabilization system and six (6) storage silos. Biosolids are discharged from the centrifuge into the silos for storage until land application or other beneficial reuse.

These process units allow the sludge to be processed to meet Class A pathogen requirements. In the event that digestion is inadequate or the digesters are unavailable for use, the sludge could be lime stabilized to meet Class B pathogen requirements.

The biosolids are currently land applied by a contractor – Synagro. In addition to land application, the facility may also dispose of biosolids through a soil amendment operation that blends Class A biosolids with woody waste or incineration at the Hopewell Regional Wastewater Treatment Facility. No biosolids were transported to the soil amendment operation in 2012 and the incineration option is for emergency use only. The soil amendment operation is currently in the process of obtaining a Virginia Pollution Abatement (VPA) permit in order to begin operations; thus, it is anticipated that a portion of the biosolids will begin to be diverted to this beneficial reuse operation.

Per the application package, dated 1 November 2013, this facility generated 5481 dry metric tons in 2012.

12. Permitted Discharges and Monitoring Stations Located Within Waterbody VAN-A13E:

TABLE 2
DISCHARGES & MONITORING STATIONS

ID / Permit Number	Facility Name	Type	Receiving Stream
1aHUT000.01	DEQ ambient monitoring station		
VA0087068	City of Alexandria Combined Sewer System	Major Municipal Discharge	Hunting Creek – Outfall 002

13. Material Storage:

See **Attachment 5** for a list of onsite chemicals and storage locations.

14. Site Inspection:

Performed by NRO Compliance Staff on 15 March 2012 (see **Attachment 6**).

A subsequent inspection was conducted at Alexandria Renew Enterprises and the City of Alexandria Combined Sewer System by the Environmental Protection Agency (EPA) Region III Enforcement Branch on 26 and 27 June 2012 (DEQ Compliance and Permitting staff were present).

See **Attachment 7** for the EPA inspection report minus exhibits and attachments.

It should be noted that discrepancies were noted in the report and communicated to the EPA inspection team by DEQ, City of Alexandria and Alexandria Renew Enterprises staff; however, no revised inspection report has been received.

15. Receiving Stream Water Quality and Water Quality Standards:

a) Ambient Water Quality Data

Outfall 001

Outfall 001 discharges into tidal Hunting Creek. The closest DEQ monitoring station is 1aHUT000.01, located at the G.W. Parkway bridge crossing, approximately 0.4 miles downstream of Outfall 001.

The following is the summary for the tidal portion of Hunting Creek, as taken from the 2012 Integrated Report:

Class II, Section 6, special standards b, y.

DEQ monitoring stations located in tidal Hunting Run:

- Ambient water quality and fish tissue monitoring station 1aHUT000.01, at the George Washington Parkway;
- Ambient monitoring station 1aHUT001.54, 300 yards downstream from Telegraph Road;
- Ambient monitoring station 1aHUT001.72, at Route 611/241 (Telegraph Road); and
- Ambient monitoring station NHUT01 at Belle Haven Marina Dock.

The fish Consumption Use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, polychlorinated biphenyl (PCB) fish consumption advisory and PCB fish tissue monitoring. Additionally, semi-permeable membrane device (SPMD) data at station 1aHUT001.54 and water quality data at station 1aHUT001.72 each revealed exceedances of the human health criteria of 0.64 parts per billion (ppb) PCBs. A PCB Total Maximum Daily Load (TMDL) for the tidal Potomac River watershed has been completed and approved as noted in Table 3 on page 6 of this Fact Sheet.

Observed effects are noted for the following: an excursion above the tissue value (TV) of 300 parts per billion (ppb) for mercury (Hg) in fish tissue was recorded in tissue from one specie (largemouth bass) of fish sampled in 2008 at monitoring station 1aHUT000.01; excursions above the tissue value (TV) of 110 parts per billion (ppb) for total chlordane in fish tissue were recorded in tissue from one specie (carp) of fish sampled (2 excursions) in 2008 at monitoring station 1aHUT000.01; excursions above the tissue value (TV) of 4.4 parts per billion (ppb) for heptachlor epoxide in fish tissue were recorded in tissue from one specie (carp) of fish sampled (2 excursions) in 2008 at monitoring station 1aHUT000.01.

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the Recreation Use. A bacteria TMDL for the Hunting Creek watershed has been completed and approved (see Table 3).

The Wildlife Use is considered fully supporting.

The Aquatic Life Use is fully supporting in tidal Hunting Creek.

A TMDL has been completed for the Chesapeake Bay watershed. This downstream TMDL, completed by EPA, addresses the poor water quality in the Chesapeake Bay and takes into account the entire Bay watershed including upstream tidal tributaries such as Hunting Creek. The submerged aquatic vegetation data is assessed as fully supporting the Aquatic Life Use. For the open water aquatic life sub-use; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed. An observed effect is noted for the Aquatic Life Use due to an exceedance of the chlordane ER-M sediment screening criteria of 6 ppb (dry weight) for a sediment sample collected in 2000.

Outfall 002

Outfall 002 discharges into tidal Hooff Run. The closest DEQ monitoring station is located downstream of Outfall 002 in the tidal portion of Hunting Creek; station 1aHUT000.01 is located at the G.W. Parkway bridge crossing, approximately 0.78 miles downstream of Outfall 002. Although there is no DEQ monitoring station located in Hooff Run, the segment has been assessed. The following is the summary for the tidal portion of Hooff Run, as taken from the 2012 Integrated Report:

Class II, Section 6, special standard. b, y.

The fish Consumption Use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, polychlorinated biphenyl (PCB) fish consumption advisory.

The Aquatic Life Use is fully supporting.

A TMDL has been completed for the Chesapeake Bay watershed. This downstream TMDL completed by EPA addresses the poor water quality in the Chesapeake Bay and takes into account the entire Bay watershed including upstream tidal tributaries such as Hooff Run. The submerged aquatic vegetation data is assessed as fully supporting the Aquatic Life Use. For the open water aquatic life sub-use; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed.

The Recreation and Wildlife Uses were not assessed.

b) 303(d) Listed Stream Segments and Total Maximum Daily Loads (TMDLs)

TABLE 3
RECEIVING STREAM 303(d) IMPAIRMENTS AND TMDLs

Waterbody Name	Impaired Use	Cause	TMDL Completion/Schedule	WLA	Basis for WLA
Impairment Information in the 2012 Integrated Report					
Outfall 001					
Hunting Creek	Recreation	*E. coli*	Hunting Creek Watershed Bacteria 10 November 2010	9.40E+13 cfu/year *E. coli*	126 cfu/100mL *E. coli* --- 54 MGD
	Fish Consumption	PCBs	Tidal Potomac River PCB 31 October 2007	4.77 grams/year PCB	0.064 ng/L PCB --- 54 MGD
Outfall 002					
Hooff Run	Fish Consumption	PCBs	Tidal Potomac River PCB 31 October 2007	WLA assigned to facility, for Outfall 001. As noted above the WLA is 4.77 grams/year of PCBs.	

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TABLE 4
DOWNSTREAM 303(d) IMPAIRMENTS AND TMDLs

Waterbody Name	Impaired Use	Cause	TMDL Completion/Schedule	WLA	Basis for WLA
Information in the Chesapeake Bay TMDL					
Chesapeake Bay	Aquatic Life	Total Nitrogen	Chesapeake Bay TMDL 29 December 2010	500,690 lbs/yr TN	Edge of Stream (EOS) Loads
		Total Phosphorus		29,932 lbs/yr TP	
		Total Suspended Solids		4,988,627 lbs/yr TSS	

This facility discharges directly to Hunting Creek; located within the Chesapeake Bay watershed. The receiving stream has been addressed in the Chesapeake Bay TMDL, completed by the Environmental Protection Agency (EPA) on 29 December 2010. The TMDL addresses dissolved oxygen (D.O.), chlorophyll a and submerged aquatic vegetation (SAV) impairments in the main stem Chesapeake Bay and its tidal tributaries by establishing non-point source load allocations (LAs) and point-source waste load allocations (WLAs) for total nitrogen (TN), total phosphorus (TP) and total suspended solids (TSS) to meet applicable Virginia Water Quality Standards contained in 9VAC25-260-185. This facility is considered a Significant Chesapeake Bay wastewater discharge and has been assigned wasteload allocations as noted in Table 4 above.

Implementation of the Chesapeake Bay TDML is currently accomplished in accordance with the Commonwealth of Virginia's Phase I Watershed Implementation Plan (WIP); approved by EPA on 29 December 2010. The approved WIP recognizes that the TMDL nutrient WLAs for Significant Chesapeake Bay wastewater dischargers are set in two regulations: 1) the Water Quality Management Planning Regulation (9VAC25-720); and 2) the *General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed of Virginia* (9VAC25-820). The WIP states that since TSS discharges from wastewater facilities represent an insignificant portion of the Bay's total sediment load, they may be considered aggregated and wastewater discharges with technology-based TSS limits are considered consistent with the TMDL.

40 CFR 122.44(d)(1)(vii)(B) requires permits to be written with effluent limits necessary to meet water quality standards and to be consistent with the assumptions and requirements of applicable WLAs. DEQ has provided coverage under the VPDES Nutrient General Permit (GP) for this facility under permit VAN010059. The requirements of the Nutrient GP currently in effect for this facility are consistent with the Chesapeake Bay TMDL. This individual permit includes TSS limits that are also consistent with the Chesapeake Bay TMDL and WIP. In addition, the individual permit addresses limitations for the protection of instream dissolved oxygen concentrations as detailed in Section 19 of this Fact Sheet.
The proposed effluent limits within this individual permit are consistent with the Chesapeake Bay TMDL and will not cause an impairment or observed violation of the standards for D.O., chlorophyll a or SAV as required by 9VAC25-260-185.

The full planning statement may be located in **Attachment 8**.

c) Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream Hunting Creek is located within Section 6 of the Potomac River Basin and classified as Class II water.

Class II tidal waters in the Chesapeake Bay and it tidal tributaries must meet dissolved oxygen concentrations as specified in 9VAC25-260-185 and maintain a pH of 6.0 – 9.0 standard units as specified in 9VAC25-260-50. In the Northern Virginia area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use.

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The applicable dissolved oxygen concentrations are presented in Table 5 below.

TABLE 5
DISSOLVED OXYGEN CRITERIA
9VAC25-260-185

Designated Use	Criteria Concentration / Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean > 6 mg/L (tidal habitats with 0-0.5 ppt salinity)	February 1 – May 31
	Instantaneous minimum > 5 mg/L	
Open-water[1]	30-day mean > 5.5 mg/L (tidal habitats with 0-0.5 ppt salinity) 30-day mean > 5 mg/L (tidal habitats with > 0.5 ppt salinity)	Year – round[2]
	7-day mean > 4 mg/L	
	Instantaneous minimum > 3.2 mg/L at temperatures < 29° C Instantaneous minimum > 4.3 mg/L at temperatures > 29° C	
Deep-water	30-day mean > 3 mg/L	June 1 – September 30
	1-day mean > 2.3 mg/L	
	Instantaneous minimum > 1.7 mg/L	
Deep-channel	Instantaneous minimum > 1 mg/L	June 1 – September 30

[1] In applying this open water instantaneous criterion to the Chesapeake Bay and its tidal tributaries where the existing water quality for dissolved oxygen exceeds an instantaneous minimum of 3.2 mg/L, that higher water quality for dissolved oxygen shall be provided antidegradation protection in accordance with 9VAC25-610-30.A.2.

[2] Open-water dissolved oxygen criteria attainment is assessed separately over two time periods: summer (June 1 – September 30) and non-summer (October 1 – May 31) months.

Attachment 9 details the Water Quality Criteria / Wasteload Allocation Analysis for each temporal period that is applicable to the receiving stream.

It should be noted that the discharge point for this facility is located within a dynamic portion of the receiving stream. This section of Hunting Creek not only exhibits tidal influences but also has freshwater inputs. Staff believed that all information should be accounted for during the criteria analyses. By accounting for the freshwater aspects, the criteria for some parameters changed; however, staff feels this is a better representation of actual conditions at the outfall/discharge point. Each analysis endeavors to reflect (1) freshwater flow inputs as noted in **Attachment 1**; (2) the 1997 dilution study results as noted in Section 17.b. of this Fact Sheet; and (3) tidal influences.

Therefore, staff conducted a mixing analysis to account for the freshwater inputs utilizing the inputs provided in the flow frequency determination memorandum and the stream dimensions. Analysis outputs for both low and high stream flow conditions are located in **Attachment 10**. These percentages were included in the wasteload allocation calculations. Staff recognizes that freshwater impacts would vary; however, differentiating tidal periods would not be practicable.

In addition to the freshwater flows, it was necessary to simulate the aforementioned tidal influences. Staff accomplished this by incorporating the applicable instream waste concentration (IWC) determinations as noted in the dilution study and adjusting the stream flow inputs during each respective temporal period. These modified stream flow data inputs are not truly indicative of the receiving stream but allow incorporating the IWCs while coercing the program to mimic the tidal influences.

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Ammonia:

The fresh water, aquatic life Water Quality Criteria for ammonia is dependent on the instream and/or effluent pH and temperature. The 90th percentile pH and temperature values are utilized since they best represent the critical conditions of the receiving stream. **Attachment 11** presents the derivation of the 90th percentile effluent pH values obtained from the June 2009 – September 2013 reported discharge monitoring data. Since effluent temperature data was not readily available, staff utilized a default value of 25° C and an assumed value of 15° C for summer and winter, respectively.

DEQ recorded ambient water quality data from January 1990 to February 2011 provided a 90th percentile pH value of 7.6 S.U. and temperature values of 26.6° C and 14.5° C for summer and winter, respectively.

Metals Criteria:

The Water Quality Criteria for some metals are dependent on the receiving stream and/or effluent hardness values (expressed as mg/L calcium carbonate). The hardness-dependent metals criteria found in **Attachment 9** are based on a DEQ reported receiving stream average value of 101.2 mg/L and an effluent value of 119 mg/L as reported in the permit application; each expressed as $CaCO_3$.

Bacteria Criteria:

The Virginia Water Quality Standards at 9VAC25-260-170.A state that the following criteria shall apply to protect primary recreational uses in surface waters:

E. coli bacteria per 100 mL of water shall not exceed the following:

	Geometric Mean[1]
Freshwater *E. coli* (N/100 mL)	126

[1]For a minimum of four weekly samples taken during any calendar month

d) Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, Hunting Creek, is located within Section 6 of the Potomac River Basin. This section has been designated with special standards "b" and "y".

Special Standard "b" (Potomac Embayment Standards) established effluent standards for all sewage plants discharging into Potomac River embayments and for expansions of existing plants discharging into non-tidal tributaries of these embayments. 9VAC25-415, Policy for the Potomac Embayments controls point source discharges of conventional pollutants into the Virginia embayment waters of the Potomac River, and their tributaries, from the fall line at Chain Bridge in Arlington County to the Route 301 Bridge in King George County. The regulation sets effluent limits for biochemical oxygen demand-5 day, total suspended solids, phosphorus and ammonia to protect the water quality of these high profile waterbodies.

Special Standard "y" is the chronic ammonia criterion for tidal freshwater Potomac River and tributaries that enter the tidal freshwater Potomac River from Cockpit Point (below Occoquan Bay) to the fall line at Chain Bridge. During November 1 through February 14 of each year the thirty-day average concentration of total ammonia nitrogen (in mg N/L) shall not exceed, more than once every three years on the average the following chronic ammonia criterion:

$$\left(\frac{0.0577}{1 + 10^{7.688\text{-pH}}} + \frac{2.487}{1 + 10^{\text{pH-7.688}}} \right) \times 1.45(10^{0.028(25\text{-MAX})})$$

MAX = temperature in °C or 7, whichever is greater.

The default critical stream flows for calculating steady state wasteload allocations for this chronic ammonia criterion is the 30Q10, unless statistically valid methods are employed that demonstrate compliance with the duration and return frequency of this water quality criterion.

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e) Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched on 5 November 2013 for records to determine if there are threatened or endangered species in the vicinity of the discharge. The following threatened or endangered species were identified within a two (2) mile radius of the discharge: Atlantic sturgeon (*Acipenser oxyrinchus*); brook floater (*Alasmidonta varicosa*); wood turtle (*Glyptemys insculpta*); upland sandpiper (*Bartramia longicauda*); loggerhead shrike (*Lanius ludovicianus*); Henslow's sparrow (*Ammodramus henslowii*); Appalachian grizzled skipper (*Pyrgus wyandot*); and migrant loggerhead shrike (*Lanius ludovicianus migrans*). The proposed limitations within this draft permit are protective of the Virginia Water Quality Standards and protect the threatened and endangered species found near the discharge.

The stream that the facility discharges to is within a reach identified as having an Anadromous Fish Use. It is staff's best professional judgment that the proposed limits are protective of this use.

In addition, the Virginia Department of Game and Inland Fisheries and the United States Fish and Wildlife Service were coordinated during this reissuance per the procedures as set forth in the 2007 Memorandum of Understanding (MOU) concerning Threatened and Endangered Species Screening for VPDES Permits. The purpose of this coordination is to obtain input from other agencies during the permitting process to ascertain potential adverse impacts to threatened and endangered species and/or their habitats.

Any comments from these agencies are located in Section 26 of this Fact Sheet.

16. Antidegradation (9VAC25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The receiving stream has been classified as Tier 1 based on the noted impairments found in Section 15 of this Fact Sheet. It is staff's best professional judgment that streams with these impairments are Tier 1 and the proposed permit conditions and limitations that have been established will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. Effluent Screening, Wasteload Allocation and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points are equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLAs) are calculated. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute WLA or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic WLA. In the case of ammonia evaluations, limits are needed if the 97th percentile of the thirty-day average effluent concentration value is greater than the chronic WLA. Effluent limitations are then calculated based on the most limiting WLA, the required sampling frequency and statistical characteristics of the effluent data.

a) Effluent Screening

Effluent data obtained from the permit application and June 2009 – September 2013 Discharge Monitoring Reports (DMRs) have been reviewed and determined to be suitable for evaluation. Please see **Attachment 12** for a summary of effluent data.

The following metals were reported above the method detection limit (MDL) on Form 2A, Part D. of the permit application: copper and zinc. The reported data warrants a determination if a reasonable potential exists and if effluent limits or monitoring is required.

Since this is a facility treating domestic wastewater, ammonia could be present in the discharge and a reasonable potential determination by staff is warranted. In addition, the disinfection method at emergency Outfall 002 warrants a reasonable potential analysis for chlorine.

b) Mixing Zones and Wasteload Allocations (WLAs)

Hunting Creek, at the point of discharge, is a tidal estuary and has tidal influences. For tidal estuaries, agency guidance states that wasteload allocations should be based on site-specific data of waste dispersion or dilution. Instances that data is not available, default assumptions are recommended. Acute wasteload allocations are established by multiplying the acute water quality criteria by a factor of two (2). The 2X factor is derived from the fact that the acute criteria are defined as one half of the final acute value (FAV) for a specific toxic pollutant. The term "final acute value" is defined as a cumulative probability of 0.05 for the acute toxicity values for all genera for which acceptable acute tests have been conducted with toxicants (Guidance Memo 00-0211).

Conversely, agency guidance recommends a default dilution factor of 50:1 for chronic toxicity. However, the permittee conducted a site specific dilution study and near field-mixing analysis in 1997 for Hunting Creek. DEQ staff reviewed and partially accepted the results of the study for the evaluation of chronic WLAs. Refer to **Attachment 13** for the dilution study and subsequent correspondence regarding the results.

The instream waste concentrations (IWCs) of 83% for the months of November – March and 91% for April – October within segment 6 of the model was accepted as the minimum instream dilution required as to not causing or contributing to any downstream water quality violations.

It is staff's practice not to tier toxic pollutants such as metals and chlorine. As such, the chronic WLAs for these pollutants will be determined using the most stringent IWC. The calculated wasteload allocations located in **Attachment 9** make an allowance for these accepted IWCs as described in Section 15.c. of this Fact Sheet.

The subsequent limit derivations/reasonable potential analyses include the acute water quality criteria multiplied by a factor of two (2) as stated above. There was no dilution allowed for the chronic water quality criteria as the IWCs essentially comprise the receiving stream.

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{C_o [Q_e + (f)(Q_s)] - [(C_s)(f)(Q_s)]}{Q_e}$$

Where:

- WLA = Wasteload allocation
- C_o = In-stream water quality criteria
- Q_e = Design flow
- f = Decimal fraction of critical flow from mixing evaluation
- Q_s = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; 30Q10 for ammonia criteria; harmonic mean for carcinogen-human health criteria; and 30Q5 for non-carcinogen human health criteria)
- C_s = Mean background concentration of parameter in the receiving stream

c) Effluent Limitations, Outfall 001 & Outfall 002 – *Policy for the Potomac River Embayments*

The *Policy for the Potomac River Embayments* (*PPRE*), 9VAC25-415 et seq., established the following effluent limitations; applicable to all sewage treatment plants discharging into the Virginia embayment waters of the Potomac River from the fall line at Chain Bridge in Arlington County to the Route 301 Bridge in King George County:

Parameter	Monthly Average
$cBOD_5$	5 mg/L
Total Suspended Solids	6.0 mg/L
Total Phosphorus	0.18 mg/L
Ammonia (April 1 – October 31)	1.0 mg/L

The *PPRE* further states that the "above limitations shall not replace or exclude the discharge from meeting the requirements of the State's Water Quality Standards (9VAC25-260 et seq.)". These limitations are protective of the criteria for dissolved oxygen.

d) Effluent Limitations, Outfall 001 & Outfall 002 – Toxic Pollutants

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9VAC25-31-230.D requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N/TKN:

April 1st through October 31st

The *Policy for the Potomac River Embayments* (*PPRE*) states that the monthly average limit of 1.0 mg/L will be imposed for the months of April through October. This limit is more stringent than the water quality-based limits that were calculated in **Attachment 14**; therefore, the *PPRE* monthly average limit of 1.0 mg/L will continue to be imposed and carried forward along with the weekly average limit of 4.4 mg/L. The weekly average was based on calculated water quality criteria during the 2004 reissuance. The limit derivation is also included in the aforementioned attachment.

Loading limits are not normally assigned to toxic parameters since the water quality criteria are concentration based, per DEQ Guidance Memorandum 00-2011. However, loading limits for ammonia are included in this permit for the months of April through October. This is based on the nutrient model utilized to establish the PPRE limitations, not the toxic water quality criteria.

November 1st through January 31st

Special Standard 'y' states the period for Early Life Stages Absent as November 1st through February 14th. It is impractical to establish limits for half a calendar month; therefore, it is staff's best professional judgement that limits be proposed for November through January. This conservative approach ensures protection against chronic toxicity for any consecutive 30-day period during February and March.

Based on the WLA and subsequent limit derivations, it was determined that a monthly average and weekly average limits of 11 mg/L and 13 mg/L, respectively, are warranted. However, antibacksliding provisions state that a permit may not be renewed, reissued or modified to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit (9VAC25-31-220.L.). Therefore, it is proposed that the current monthly average limit of 8.4 mg/L and a weekly average limit of 10 mg/L be carried forward with this reissuance.

February 1st through March 31st

The limits for February 1st through March 31st are based on water quality criteria for Early Life Stages Present. Limit derivations stated that monthly average of 10 mg/L and weekly average of 13 mg/L be imposed during this reissuance. However, due to antibacksliding provisions, it is proposed that the monthly average of 6.9 mg/L and a weekly average of 8.5 mg/L, as calculated during the previous reissuance, be carried forward.

See **Attachment 14** for ammonia limit derivations.

In addition to antibacksliding provisions as mentioned prior, the Environmental Protection Agency (EPA) finalized new, more stringent ammonia criteria in August 2013; possibly resulting in significant reductions in ammonia effluent limitations. It is staff's best professional judgement that incorporation of these criteria into the Virginia Water Quality Standards is forthcoming. This and many other facilities may be required to comply with these new criteria during their next respective permit terms.

2) Total Residual Chlorine (TRC) at Outfall 002 only:

Outfall 002 serves as an emergency discharge point for this facility in case the UV disinfection system should fail. The back-up disinfection would consist of chlorination/dechlorination; thus, limitations are necessary since chlorine would potentially be present in the discharge.

Staff calculated WLAs for TRC utilizing freshwater flow inputs, dilution study results and tidal influences. In accordance with current DEQ guidance, staff used a default data point of 20 mg/L and the calculated WLAs to derive limits. A monthly average of 0.017 mg/L and a weekly average limit of 0.019 mg/L were ascertained (see **Attachment 15**). These limitations are less stringent than the current limits of 0.009 mg/L and 0.011 mg/L for monthly and weekly averages, respectively. However, it is staff's best professional judgement that the calculated WLAs during this reissuance better characterize the receiving stream and discharge interaction (see Section 15.c). Therefore, it is proposed that the new limitations be imposed for this discharge. Backsliding is permissible based on technical errors during previous permit reissuances.

3) Metals/Organics:

Limitations for either copper or zinc are not warranted based on (1) the calculated wasteload allocations; (2) reported effluent data from the permit application; and (3) the subsequent reasonable potential analysis (see **Attachment 16**).

e) Effluent Limitations and Monitoring, Outfall 001 & Outfall 002 – Conventional and Non-Conventional Pollutants

No changes to dissolved oxygen (D.O.), carbonaceous-biochemical oxygen demand-5 day ($cBOD_5$), total suspended solids (TSS), total Kjeldahl nitrogen (TKN) and pH limitations are proposed.

pH limitations are set at the water quality criteria.

E. coli limitations are in accordance with the Water Quality Standards 9VAC25-260-170.

f) Effluent Annual Average Limitations and Monitoring, Outfall 001 & Outfall 002 – Nutrients

VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries. Only concentration limits are now found in the individual VPDES permit when the facility installs nutrient removal technology. The basis for the concentration limits is 9VAC25-40 – *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* which requires new or expanding discharges with design flows of $\geq$ 0.04 MGD to treat for total nitrogen (TN) and total phosphorus (TP) to either biological nutrient removal (BNR) levels achieving a TN of 8 mg/L and TP of 1.0 mg/L or state of art (SOA) levels achieving a TN of 3.0 mg/L and TP of 0.3 mg/L.

This facility has obtained coverage under 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.* This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN010059. Total Nitrogen Annual Loads and Total Phosphorus Annual Loads from this facility are found in 9VAC25-720 – *Water Quality Management Plan Regulation* which sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges, i.e., those with design flows of $\geq$ 0.5 MGD above the fall line and $\geq$ 0.1 MGD below the fall line.

Monitoring for nitrates + nitrites, total Kjeldahl nitrogen and total nitrogen are included in this permit. The monitoring is needed to protect the Chesapeake Bay Water Quality Standards. Monitoring frequencies are set at the frequencies set forth in 9VAC25-820. Annual average effluent limitations, as well as monthly and year to date calculations, for total nitrogen are included in this individual permit. The annual averages are based on the technology installed as part of a Water Quality Improvement Fund (WQIF) grant, 9VAC25-40 and agency guidance memorandum GM07-2008.

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The facility is currently in the midst of upgrading the existing infrastructure and installing additional processes as part of a two-phased approach to ultimately achieve a total nitrogen (TN) annual average concentration of 3 mg/L as set forth in the *Water Quality Management Plan Regulation* (9VAC25-720-50.C). In the interim, it is proposed that an annual average TN concentration of 6 mg/L be proposed. This is based on the existing plant configuration/operation, completed upgrades and the best engineering assessment concerning the attainable level of treatment during construction. Further upgrades will ensure a consistent and reliable level of treatment required to meet the wasteload allocation of 493,381 lb/year for total nitrogen (3 mg/L annual average) at the 54 MGD design flow. These limitations will become effective January 1st following issuance of the Certificate to Operate (CTO).

Total phosphorus annual average limits are not included in this permit reissuance since the facility has monthly average and weekly average concentration limitations in place for local water quality. The *Policy for the Potomac River Embayments (PPRE)*, 9VAC25-415-40, sets forth a monthly average of 0.18 mg/L for sewage treatment plants discharging to all Potomac embayments and each respective tidal and nontidal tributaries. Additionally, the *Policy* suggests water quality modeling may be required if staff believed the *PPRE* limits may not be sufficient to protect the receiving waters. This limitation also reflects the calculated wasteload allocation found in 9VAC25-720-50.C for this facility. It is staff's best professional judgement that this monthly average limit be carried forward without the annual average since the regulations governing nutrient loadings was based upon this local water quality monthly average.

g) Effluent Limitations and Monitoring Summaries

The effluent limitations and monitoring are presented in Sections 19.a. through 19.e. Limits were established for pH, carbonaceous-biochemical oxygen demand-5 day ($cBOD_5$), total suspended solids (TSS), dissolved oxygen (DO), ammonia as N, *E. coli*, total residual chlorine (TRC), total nitrogen and total phosphorus. The facility will be required to monitor for total Kjeldahl nitrogen (TKN) and chronic whole effluent toxicity.

The limit for total suspended solids is based on Best Professional Judgement.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and then a conversion factor of 3.785.

The mass loading (lb/d) for total phosphorus monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 8.345.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual except for TKN and nitrate+nitrite; as those monitoring frequencies reflect those set forth in 9VAC25-820-70.E.1, *General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.*

The monitoring frequency for total residual chlorine was set at four times per day (4/D) as opposed to once every 2 hours (1/2Hrs) as recommended in the current VPDES Permit Manual. The permittee asked if the frequency could be reduced. The proposed frequency is based on the infrequent use of this outfall; this is for emergency use only and has not discharged in the last 10 years. It should be noted that this same frequency was allowed for the Town of Leesburg due to the distance between the plant and the final discharge point.

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for cBOD and TSS (or 65% for equivalent to secondary). The limits in this permit are water quality-based effluent limits and result in greater than 85% removal.

Staff reviewed the Maryland Water Quality Standards found at COMAR26.08.02 et seq., effective 2 April 2012. Based on the compliance history at this facility, the distance from the Maryland political boundary and the proposed limitations set forth, it is staff's best professional judgement that the proposed limitations should not contravene these standards.

18. Antibacksliding:

Total residual chlorine limits in this permit are less stringent than those previously established. Based on technical errors found in the previous calculations, the proposed backsliding with this reissuance conforms to the antibacksliding provisions of Section 402(o) of the Clean Water Act, 9VAC25-31-220.L. and 40 CFR 122.44.

19a. Effluent Limitations/Monitoring Requirements: Stormwater Outfalls 003, 005, 007, 009, 011, 013, 015

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

No monitoring or effluent limitations are proposed for this outfall.

There shall be no discharge of process wastewater from this outfall.

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19.b. Effluent Limitations/Monitoring Requirements for Outfall 001:

Design flow is 54 MGD.

Effective Dates: During the period beginning with the permit's effective date and lasting until issuance of the CTO for the 54 MGD nutrient upgrade or the expiration date, whichever comes first.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$	4	5 mg/L 1000 kg/day	8 mg/L 1600 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	4,8	6.0 mg/L 1200 kg/day	9.0 mg/L 1800 kg/day	NA	NA	1/D	24H-C
Dissolved Oxygen (DO)	3	NA	NA	6.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	2	NL mg/L	NL mg/L	NA	NA	3D/W	24H-C
Ammonia, as N (April – October)	4	1.0 mg/L 200 kg/day	4.4 mg/L 900 kg/day	NA	NA	1/D	24H-C
Ammonia, as N (November – January)	3	8.4 mg/L	10 mg/L	NA	NA	1/D	24H-C
Ammonia, as N (February – March)	3	6.9 mg/L	8.5 mg/L	NA	NA	1/D	24H-C
E. coli (Geometric Mean) [a]	3,6	126 n/100 mL	NA	NA	NA	1/D	Grab
Nitrate+Nitrite, as N	5,7	NL mg/L	NA	NA	NA	3D/W	24H-C
Total Nitrogen [b]	5,7	NL mg/L	NA	NA	NA	3D/W	Calculated
Total Nitrogen – Year to Date [c]	5,7	NL mg/L	NA	NA	NA	1/M	Calculated
Total Nitrogen – Calendar Year [c] [d] [e] [f]	5,7,8	6.0 mg/L	NA	NA	NA	1/Y	Calculated
Total Phosphorus	4,5,8	0.18 mg/L 81 lb/day	0.27 mg/L 120 lb/day	NA	NA	1/D	24H-C
Chronic Toxicity – *C. dubia*		NA	NA	NA	NL TU_c	1/Y	24H-C
Chronic Toxicity – *P. promelas*		NA	NA	NA	NL TU_c	1/Y	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards
4. 9VAC25-415 (PPRE)
5. 9VAC25-820 (Watershed General Permit)
6. Hunting Creek Bacteria TMDL
7. 9VAC25-40 (Nutrient Regulation)
8. Chesapeake Bay TMDL

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.
3D/W = Three days a week.
1/M = Once per month.
1/Y = Once per calendar year.

24H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

[a] Samples shall be collected between 10:00 a.m. and 4:00 p.m.

[b] Total Nitrogen = Sum of TKN plus Nitrate+Nitrite.

[c] See Section 20.a. for more information on the Nutrient Calculations.

[d] See Section 21.d. for CTC/CTO Requirement.

[e] Should the permittee discharge from Outfall 002, the Total Nitrogen effluent data from Outfall 001 and Outfall 002 shall be averaged together for purposes of calculating compliance.

[f] See Section 21.h. for Total Nitrogen – Annual Average Concentration.

19.c. Effluent Limitations/Monitoring Requirements for Outfall 002:

Design flow is 54 MGD.

Effective Dates: During the period beginning with the permit's effective date and lasting until issuance of the CTO for the 54 MGD nutrient upgrade or the expiration date, whichever comes first.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$	4	5 mg/L 1000 kg/day	8 mg/L 1600 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	4,8	6.0 mg/L 1200 kg/day	9.0 mg/L 1800 kg/day	NA	NA	1/D	24H-C
Dissolved Oxygen (DO)	3	NA	NA	6.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	2	NL mg/L	NL mg/L	NA	NA	3D/W	24H-C
Ammonia, as N (April – October)	4	1.0 mg/L 200 kg/day	4.4 mg/L 900 kg/day	NA	NA	1/D	24H-C
Ammonia, as N (November – January)	3	8.4 mg/L	10 mg/L	NA	NA	1/D	24H-C
Ammonia, as N (February – March)	3	6.9 mg/L	8.5 mg/L	NA	NA	1/D	24H-C
E. coli (Geometric Mean) [a]	3,6	126 n/100 mL	NA	NA	NA	1/D	Grab
Total Residual Chlorine (after dechlorination)	3	0.017 mg/L	0.019 mg/L	NA	NA	4/D	Grab
Nitrate+Nitrite, as N	5,7	NL mg/L	NA	NA	NA	3D/W	24H-C
Total Nitrogen [b]	5,7	NL mg/L	NA	NA	NA	3D/W	Calculated
Total Nitrogen – Year to Date [c]	5,7	NL mg/L	NA	NA	NA	1/M	Calculated
Total Nitrogen – Calendar Year [c] [d] [e] [f]	5,7,8	6.0 mg/L	NA	NA	NA	1/Y	Calculated
Total Phosphorus	4,5,8	0.18 mg/L 81 lb/day	0.27 mg/L 120 lb/day	NA	NA	1/D	24H-C
Chronic Toxicity – *C. dubia*		NA	NA	NA	NL TU_c	1/Y	24H-C
Chronic Toxicity – *P. promelas*		NA	NA	NA	NL TU_c	1/Y	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards
4. 9VAC25-415 (PPRE)
5. 9VAC25-820 (Watershed General Permit)
6. Hunting Creek Bacteria TMDL
7. 9VAC25-40 (Nutrient Regulation)
8. Chesapeake Bay TMDL

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
TIRE = Totalizing, indicating and recording equipment.

4/D = Four times every day.
1/D = Once every day.
3D/W = Three days a week.
1/M = Once per month.
1/Y = Once per calendar year.

24H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

[a] Samples shall be collected between 10:00 a.m. and 4:00 p.m.

[b] Total Nitrogen = Sum of TKN plus Nitrate+Nitrite.

[c] See Section 20.a. for more information on the Nutrient Calculations.

[d] See Section 21.d. for CTC/CTO Requirement.

[e] Should the permittee discharge from Outfall 002, the Total Nitrogen effluent data from Outfall 001 and Outfall 002 shall be averaged together for purposes of calculating compliance.

[f] See Section 21.h. for Total Nitrogen – Annual Average Concentration.

19.d. Effluent Limitations/Monitoring Requirements for Outfall 001:

Design flow is 54 MGD.

Effective Dates: During the period beginning with issuance of the CTO for the 54 MGD nutrient upgrade and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$	4	5 mg/L 1000 kg/day	8 mg/L 1600 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	4,8	6.0 mg/L 1200 kg/day	9.0 mg/L 1800 kg/day	NA	NA	1/D	24H-C
Dissolved Oxygen (DO)	3	NA	NA	6.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	2	NL mg/L	NL mg/L	NA	NA	3D/W	24H-C
Ammonia, as N (April – October)	4	1.0 mg/L 200 kg/day	4.4 mg/L 900 kg/day	NA	NA	1/D	24H-C
Ammonia, as N (November – January)	3	8.4 mg/L	10 mg/L	NA	NA	1/D	24H-C
Ammonia, as N (February – March)	3	6.9 mg/L	8.5 mg/L	NA	NA	1/D	24H-C
E. coli (Geometric Mean) [a]	3,6	126 n/100 mL	NA	NA	NA	1/D	Grab
Nitrate+Nitrite, as N	5,7	NL mg/L	NA	NA	NA	3D/W	24H-C
Total Nitrogen [b]	5,7	NL mg/L	NA	NA	NA	3D/W	Calculated
Total Nitrogen – Year to Date [c]	5,7	NL mg/L	NA	NA	NA	1/M	Calculated
Total Nitrogen – Calendar Year [c] [d] [e]	5,7,8	3.0 mg/L	NA	NA	NA	1/Y	Calculated
Total Phosphorus	4,5,8	0.18 mg/L 81 lb/day	0.27 mg/L 120 lb/day	NA	NA	1/D	24H-C
Chronic Toxicity – *C. dubia*		NA	NA	NA	NL TU_c	1/Y	24H-C
Chronic Toxicity – *P. promelas*		NA	NA	NA	NL TU_c	1/Y	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards
4. 9VAC25-415 (PPRE)
5. 9VAC25-820 (Watershed General Permit)
6. Hunting Creek TMDL
7. 9VAC25-40 (Nutrient Regulation)
8. Chesapeake Bay TMDL

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.
3D/W = Three days a week.
1/M = Once per month.
1/Y = Once per calendar year.

24H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

[a] Samples shall be collected between 10:00 a.m. and 4:00 p.m.

[b] Total Nitrogen = Sum of TKN plus Nitrate+Nitrite.

[c] See Section 20.a. for more information on the Nutrient Calculations.

[d] Should the permittee discharge from Outfall 002, the Total Nitrogen effluent data from Outfall 001 and Outfall 002 shall be averaged together for purposes of calculating compliance.

[e] See Section 21.h. Total Nitrogen – Annual Average Concentration.

19.e. Effluent Limitations/Monitoring Requirements for Outfall 002:

Design flow is 54 MGD.

Effective Dates: During the period beginning with issuance of the CTO for the 54 MGD nutrient upgrade and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$	4	5 mg/L 1000 kg/day	8 mg/L 1600 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	4,8	6.0 mg/L 1200 kg/day	9.0 mg/L 1800 kg/day	NA	NA	1/D	24H-C
Dissolved Oxygen (DO)	3	NA	NA	6.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	2	NL mg/L	NL mg/L	NA	NA	3D/W	24H-C
Ammonia, as N (April – October)	4	1.0 mg/L 200 kg/day	4.4 mg/L 900 kg/day	NA	NA	1/D	24H-C
Ammonia, as N (November – January)	3	8.4 mg/L	10 mg/L	NA	NA	1/D	24H-C
Ammonia, as N (February – March)	3	6.9 mg/L	8.5 mg/L	NA	NA	1/D	24H-C
E. coli (Geometric Mean) [a]	3,6	126 n/100 mL	NA	NA	NA	1/D	Grab
Total Residual Chlorine (after dechlorination)	3	0.017 mg/L	0.019 mg/L	NA	NA	4/D	Grab
Nitrate+Nitrite, as N	5,7	NL mg/L	NA	NA	NA	3D/W	24H-C
Total Nitrogen [b]	5,7	NL mg/L	NA	NA	NA	3D/W	Calculated
Total Nitrogen – Year to Date [c]	5,7	NL mg/L	NA	NA	NA	1/M	Calculated
Total Nitrogen – Calendar Year [c] [d] [e]	5,7,8	3.0 mg/L	NA	NA	NA	1/Y	Calculated
Total Phosphorus	4,5,8	0.18 mg/L 81 lb/day	0.27 mg/L 120 lb/day	NA	NA	1/D	24H-C
Chronic Toxicity – *C. dubia*		NA	NA	NA	NL TU_c	1/Y	24H-C
Chronic Toxicity – *P. promelas*		NA	NA	NA	NL TU_c	1/Y	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards
4. 9VAC25-415 (PPRE)
5. 9VAC25-820 (Watershed General Permit)
6. Hunting Creek TMDL
7. 9VAC25-40 (Nutrient Regulation)
8. Chesapeake Bay TMDL

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
TIRE = Totalizing, indicating and recording equipment.

4/D = Four times every day.
1/D = Once every day.
3D/W = Three days a week.
1/M = Once per month.
1/Y = Once per calendar year.

24H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

[a] Samples shall be collected between 10:00 a.m. and 4:00 p.m.

[b] Total Nitrogen = Sum of TKN plus Nitrate+Nitrite.

[c] See Section 20.a. for more information on the Nutrient Calculations.

[d] Should the permittee discharge from Outfall 002, the Total Nitrogen effluent data from Outfall 001 and Outfall 002 shall be averaged together for purposes of calculating compliance.

[e] See Section 21.h. Total Nitrogen – Annual Average Concentration.

20. Other Permit Requirements:

a) Permit Section Part I.B. contains quantification levels and compliance reporting instructions.

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an instream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the nitrogen and phosphorus parameters shall be in accordance with the calculations set forth in 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.* §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

b) Permit Section Part I.C., details the requirements of a Pretreatment Program.

The VPDES Permit Regulation at 9VAC25-31-730 through 900., and the Federal Pretreatment Regulation at 40 CFR Part 403 requires publically owned treatment works (POTWs) with a design flow of > 5.0 MGD and receive pollutants from Industrial Users (IUs) which could pass through or interfere with the operation of the treatment facility or are otherwise subject to pretreatment standards to develop a pretreatment program.

The Alexandria Renew Enterprises Water Resources Recovery facility is a POTW with a current design capacity of 54 MGD. The Pretreatment Program was originally approved on 15 February 1984. **Attachment 17** provides an excerpt of the 2013 Alexandria Renew Enterprises Pretreatment Report; listing all industrial users that discharge to the facility, respective permits and violations reported during that calendar year.

c) Permit Section Part I.D., details the requirements for the Whole Effluent Toxicity (WET) program.

The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.I, requires limitations in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. A WET Program is imposed for municipal facilities with a design rate >1.0 MGD, with an approved pretreatment program or required to develop a pretreatment program or those determined by the Board based on effluent variability, compliance history, IWC and receiving stream characteristics. The Alexandria Renew Enterprises facility has a design flow of 54 MGD and has an approved pretreatment program; thus, requires the continuation of a WET Program to ensure that no toxics in toxic amounts are discharged from this wastewater treatment plant.

Previous WET results have indicated that the effluent is not toxic to the test species. See **Attachment 18** for a summary of the past test results. **Attachment 19** details the statistical evaluation of the previous WET results indicating that no limit is warranted. **Attachment 20** documents the calculated endpoints that will be carried forward with this reissuance.

21. Other Special Conditions:

a) 95% Capacity Reopener. The VPDES Permit Regulation at 9VAC25-31-200.B.4 requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. This facility is a POTW.

b) Indirect Dischargers. Required by VPDES Permit Regulation, 9VAC25-31-200 B.1 and B.2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

c) O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; and VPDES Permit Regulation, 9VAC25-31-190.E. The permittee shall maintain a current Operations and Maintenance (O&M) Manual. The permittee shall operate the treatment works in accordance with the O&M Manual and shall make the O&M Manual available to Department personnel for review upon request. Any changes in the practices and procedures followed by the permittee shall be documented in the O&M Manual within 90 days of the effective date of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

d) CTC/CTO Requirement. The Code of Virginia § 62.1-44.19 and the Sewage Collection and Treatment Regulations, 9VAC25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct (CTC) prior to commencing construction and to obtain a Certificate to Operate (CTO) prior to commencing operation of the treatment works.

e) Licensed Operator Requirement. The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9VAC25-31-200 C, and Rules and Regulations for Waterworks and Wastewater Works Operators (18VAC160-20-10 et seq.) requires licensure of operators. This facility requires a Class I operator.

f) Reliability Class. The Sewage Collection and Treatment Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. The facility is required to meet reliability Class of I.

g) E3/E4. 9VAC25-40-70.B. authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

h) Total Nitrogen – Annual Average Concentration. 9VAC25-31-220 states limitations must control all pollutants which the board determines are or may discharged at a level which will cause or contribute to an excursion above any water quality standard. Current and future Nitrogen Removal Technology (NRT) upgrades will enable this facility to meet the wasteload allocations as set forth in the *Water Quality Management Plan Regulation* at full design flow. Until the NRT upgrades are complete, the permittee shall maintain and operate the plant to achieve optimal nitrogen removal.

An annual average TN limitation of 3.0 mg/L will take effect January 1st following issuance of the CTO for the plant upgrade at the full 54 MGD design capacity.

i) Final Effluent Monitoring Alternative. 9VAC25-31-30 Federal Effluent Guidelines incorporates by reference Secondary Treatment 40 CFR Part 133 (1999). 40 CFR Part 133.104 permits the substitution of chemical oxygen demand (COD) or total organic carbon (TOC) for BOD_5 when a long-term BOD_5 : COD or BOD_5 : TOC correlation has been demonstrated. This special condition allows the permittee to develop a facility specific correlation between $cBOD_5$ and COD for final effluent compliance monitoring.

The permittee may submit to DEQ for review and approval a plan of study prior to the start of the study. The plan shall include: method of analysis for COD; QA/QC procedures for the method; time frame for study; number of samples to be analyzed to establish the correlation; the statistical methods for determining the correlation; and the method of validating the established correlation.

Once the study is completed and a correlation is established, the data, QA/QC information and correlation calculations are to be submitted to DEQ for review and approval. Upon DEQ's approval of the results, the correlation shall be utilized to calculate monthly average and weekly average COD effluent limits. Monitoring for COD will be once per day and sampling will be 24-hour composites. The COD limits shall be included on the DMR and monitoring for $cBOD_5$ shall be reduced to once per week for the remaining term of the permit. COD results shall be reported in accordance with Part II.C. The facility shall be required to validate the established correlation, as outlined in the plan of study and report the validation with the monthly DMR. A summary of the validation data shall also be submitted with the permit application. If the facility fails to submit the summary validation data, the permittee will have to complete a new study for review and approval by DEQ and also return to $cBOD_5$ final effluent monitoring at the frequency required by the permit prior to beginning COD monitoring.

This special condition also allows the facility to opt out of COD final effluent monitoring and revert back to regular $cBOD_5$ monitoring at any time upon notification to DEQ in writing. The $cBOD_5$ final effluent monitoring will then become effective the first day of the next full month following the written request.

j) Nutrient Reopener. 9VAC25-40-70.A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9VAC25-31-390.A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

k) PCB Pollutant Minimization Plan. This special condition requires the permittee, upon notification from DEQ-NRO, to submit a Pollutant Minimization Plan (PMP) to identify known and unknown sources of low-level PCBs in the effluent. This special condition details the contents of the PMP and also requires an annual report on progress to identify sources.

l) Hooff Run Junction Chamber. This junction chamber is part of the sanitary collection system that intercepts flow from the Commonwealth Interceptor and the Holmes Run Trunk Sewer lines; located outside the plant's boundary line adjacent to Hooff Run. It was engineered with an overflow relief point to protect plant integrity, increase staff safety and to minimize basement backup occurrences during wet weather, high flow events that exceed the treatment plant's capacity. There is a nationwide initiative to minimize or eliminate sanitary overflow occurrences during dry or wet weather events.

The permittee will study and evaluate engineering alternatives to minimize overflow occurrences during wet weather events at the Hooff Run Junction Chamber.

As stated earlier in Section 10, this regional treatment facility serves a portion of Fairfax County and the City of Alexandria; thus, creating a multi-jurisdictional partnership in regard to the conveyance and subsequent treatment of sanitary sewage at the treatment plant. Therefore, it is DEQ's expectation that the Authority, Fairfax County and the City of Alexandria will collaborate in this engineering evaluation, as all have a share in the selected option. In addition, the City is in the midst of updating the Long Term Control Plan for the combined sewer system as set forth in their reissued permit (VA0087068); effective 23 August 2013. The combined system must comply with the bacteria loading reductions found within the Hunting Creek Bacteria TMDL. This project could address an overflow point, reduce the number/volume of overflows from the combined system and ultimately improve water quality.

Reports conveying updates and option evaluations will be due at the end of each calendar year for 2015 and 2016. In keeping with the prior discussion, the final plan and implementation schedule will be submitted before the end of 2017 or within twelve (12) months of DEQ approval of the City of Alexandria's Long Term Control Plan Update (LTCPU), whichever occurs later. The LTCPU is due ~~is due~~ on or before 23 August 2016 to DEQ-NRO for review and approval.

m) Four Mile Run Pump Station. DEQ-NRO staff has noted occurrences of reported issues at this pump station during wet weather events. Further discussions with plant staff indicated issues with excessive rags/trash that lends to pump failures. This pump station is equipped with underground holding tanks each having a capacity of one (1) million gallons. If the holding tanks fill, they are equipped with a relief overflow point that discharges to Four Mile Run. Discharges from this relief point are rare with the last occurrence in September 2011 due to a tropical storm. This storm resulted in approximately 7 inches of precipitation within 5 days.

The permittee will be required to submit plans, specifications and a tentative schedule that will address and minimize or eliminate the issues noted above. The permittee will also submit an annual update during the second (2^{nd}) year of this permit term. A completion statement will be due during the third (3^{rd}) year of this permit term. Upon completion, this project, at a minimum, will increase the reliability of the station and further reduce the likelihood of a sanitary sewer overflow.

n) TMDL Reopener. Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan or other wasteload allocation prepared under section 303 of the Act.

22. Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Permit Section Part III. Part III of the permit contains standard conditions that appear in all VPDES Permits that may be reusing reclaimed water. The proposed reuse project will supply Level 1 treated effluent for landscape water features located on the plant grounds, a new development adjacent to the facility and a non-bulk irrigation distribution system.

Due to the relatively small projected change in discharge volumes to a tidal water body and the lack of off stream users located downstream, it was DEQ-Office of Water Supply staff's best professional judgement that a cumulative impact analysis would not be warranted as necessitated under 9VAC25-740-100.B.6. (effective 29 January 2014) for all new and expanded reclamation projects.

(The remainder of this page intentionally left blank)

24. Permit Section Part IV. Part IV of the permit contains conditions and requirements for monitoring and distribution of biosolids. The VPDES Permit Regulation 9VAC25-31-420 through 729 establishes the standards for the use or disposal of biosolids; specifically land application and surface disposal, promulgated under 40 CFR Part 503. Standards consist of general requirements, pollutant limits, management practices and operational standards. Furthermore, VPA Regulation 9VAC25-32-303 through 685 sets forth the requirements pertaining to Class A and Class B biosolids. Since the facility has the option of producing either Class A or Class B material, requirements for both were included with this reissuance. The permit sets forth the parameters to be monitored, monitoring frequencies, sampling types, the Biosolids Management Plan and reporting requirements.

25. **Changes to the Permit from the Previously Issued Permit:**

a) Special Conditions:

- The PCB Monitoring special condition was removed with this reissuance since the facility completed the required monitoring during the previous permit term.
- The PCB Pollutant Minimization Plan condition was included with this reissuance.
- The Application for Reclamation and Reuse and Reclaimed Water Management Plan condition was removed with this reissuance since the application and plan were included with the reissuance application.
- Hooff Run Junction Chamber special condition was included to address the overflow point at this junction in the collection system.
- Four Mile Run Pump Station upgrade special condition was included with this reissuance to address reliability of the station.

b) Monitoring and Effluent Limitations:

- The total chlorine residual limitations were changed from 0.009 mg/L and 0.011 mg/L to 0.017 mg/L and 0.019 mg/L for the monthly and weekly averages, respectively. Staff feels that the receiving stream/discharge was better characterized during this reissuance and imposing the less stringent limitations is based on technical errors during the last reissuance.

c) Other:

- Part III of the permit was included with this reissuance in order for the facility to supply reclaimed effluent for beneficial reuse.
- Part IV was included which sets forth the conditions and requirements for producing, monitoring and distributing Class A or Class B biosolids.
- Internal Outfall 650 was added with this reissuance per Guidance Memo No. 10-2001; *Implementation Guidance for the Water Reclamation and Reuse Regulation.*
- The compliance endpoints for the whole effluent toxicity testing was adjusted during this reissuance; which reflects instream waste concentrations, mixing analysis and tidal influences that were not taken into account during the last reissuance. Backsliding is not applicable in this instance since these are compliance measurements and not limitations.
- Stormwater outfalls were recognized and authorized to discharge non-contaminated stormwater with this reissuance. The facility obtained a no-exposure certification from DEQ staff; therefore, coverage under the General VPDES Permit for Discharges of Stormwater Associated with Industrial Activity was terminated. It was staff's best professional judgement that these outfalls be incorporated into this permit. There will be no monitoring requirements associated with these discharge points.

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26. Variances/Alternate Limits or Conditions:

The monitoring frequency for total residual chlorine at Outfall 002 was set at four times per day (4/D) in lieu of once every two hours (1/2Hrs) as recommended in the current VPDES Permit Manual. This was based on the fact that this outfall is for emergency use only and that any discharge from this location would not be of long duration.

27. Public Notice Information:

First Public Notice Date: 15 January 2015 Second Public Notice Date: 22 January 2015

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: DEQ Northern Regional Office; 13901 Crown Court, Woodbridge, VA 22193; Telephone No. 703-583-3873; Douglas.Frasier@deq.virginia.gov. See **Attachment 21** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address and telephone number of the writer and of all persons represented by the commenter/requester and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

28. Additional Comments:

Previous Board Action(s):	None.
Staff Comments:	The permit was not reissued prior to the expiration date due to Department processing delays.
State/Federal Agency Comments:	See **Attachment 22** for the Department of Conservation and Recreation and U.S. Fish and Wildlife Service comments.
Public Comments:	No comments were received during the public comment period.
Owner Comments:	Several meetings between DEQ and Alexandria Renew staff occurred during the drafting of this permit in order to clarify sections and permit language.

Fact Sheet Attachments

Table of Contents

Alexandria Renew Enterprises Water Resources Recovery Facility
VA0025160
2015 Reissuance

ATTACHMENT 1

Flow Frequency Determination

PES TIER REVISION

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
Water Quality Assessments and Planning
629 E. Main Street P.O. Box 10009 Richmond, Virginia 23240

SUBJECT: Flow Frequency Determination
Alexandria STP - VA#0025160

TO: April Young, NRO

FROM: Paul Herman, WQAP Paul

DATE: December 31, 1996

COPIES: Ron Gregory, Charles Martin, File

The Alexandria STP discharges to the Hunting Creek in Alexandria, VA. Stream flow frequencies are required at this site for use by the permit writer in developing effluent limitations for the VPDES permit. The Policy for the Potomac Embayments (PES) apply to this facility thereby requiring special flow frequency analyses to determine the 1Q10 and 7Q10 during the winter months (November - March) defined by the Standard. The 1Q10 and 7Q10 flow frequencies for the summer months (April - October) are based on the analysis of data available for the period of record at the selected reference gaging station.

Hunting Creek is tidal at the discharge point. Flow frequencies are indeterminable at this site due to tidal fluctuation. A dilution factor should be used when determining effluent limitations. For more information on dilution factors, please contact Dale Phillips at (804) 698-4077.

For modeling purposes, the freshwater contribution from the Hunting Creek watershed have been calculated for the specified flow frequencies. These calculations applied drainage area proportions using a continuous record gage as a reference.

The seasonal, temperature based, flow frequencies have been determined for the reference gage used in this analysis; Cameron Run at Alexandria, VA (#02025000) which has been operated by the USGS from 1955 to 1979 and since 1986. The gage is located approximately 3.0 miles upstream of the discharge point at the Norfolk Southern Railway bridge. The flow frequencies for the gage and the discharge point are presented below.

Cameron Run at Alexandria, VA (#01653000):

Drainage Area = 33.7 mi^2

1Q10 = 1.4 cfs	PES 1Q10 = 3.1 cfs
7Q10 = 1.9 cfs	PES 7Q10 = 4.0 cfs
30Q5 = 3.8 cfs	HM = 11

The flows provided below represent the freshwater inflow to the Hunting Creek.

Hunting Creek at discharge point:

Drainage Area = 44 mi^2

1Q10 = 1.8 cfs 1.16 MGD HQ PES 1Q10 = 4.0 cfs = 2.58 MGD
7Q10 = 2.5 cfs 1.62" HQ PES 7Q10 = 5.2 cfs = 3.36 "
30Q5 = 5.0 cfs 3.23" HM = 14 cfs = 9.05 "

Be advised, the seasonal tiering defined in the Policy for Potomac Embayments is not based on stream flow. Rather, the tiers are temperature based. Procedures for establishing flows during the months included in a temperture tier are not addressed in Section III-A pages 12-17 of the "Virginia Water Control Board VPDES Technical Reference Manual".

If you have any questions concerning this analysis, please let me know.

HQ PES = NOV - MAR

ATTACHMENT 2

No-Exposure Certification Memo

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

13901 Crown Court Woodbridge, VA 22193

SUBJECT: Alexandria Renew Enterprises Water Resources Recovery Facility (VAR051503)

TO: File

FROM: Susan Mackert

DATE: July 31, 2014

COPIES: Ms. Karen Pallansch – Chief Executive Officer
Ms. Mary Ann Pietrowicz – Lead Lab Tech

A site visit was performed on July 22, 2014, to assess drainage patterns, point source discharge locations, and permit applicability for the referenced facility. Additionally, the site visit was conducted to verify information provided in a no-exposure certification request received July 9, 2014.

General Site Observations

- The facility operates under SIC Code 4952 (wastewater treatment) which falls under Sector T – Treatment Works of the Virginia Pollutant Discharge Elimination System (VPDES) General Permit for Storm Water Discharges Associated with Industrial Activity (SWGP).
- The facility is a publicly owned treatment works with a design flow of 54 Million Gallons per Day (MGD).
- The facility comprises approximately 33.5 acres with paved and grass surfaces and consists of office buildings and wastewater treatment process units.
- The facility has seven storm water outfalls.
    - Storm water Outfall 003 is located on the west side of the facility (photo 1). Due to the outfall's proximity to storm water Outfall 005 and storm water Outfall 007, the drainage area is considered a combined 8.45 acres for all three outfalls. The drainage area consists of paved surfaces with numerous drop inlets associated with non-industrial areas of the facility (photos 2 – 7). Discharge is to Hooff Run (photo 8).
    - Storm water Outfall 005 is located on the west side of the facility (photo 9). Due to the outfall's proximity to storm water Outfall 003 and storm water Outfall 007, the drainage area is considered a combined 8.45 acres for all three outfalls. The drainage area consists of paved surfaces with numerous drop inlets associated with non-industrial areas of the facility (photos 10 – 12). Discharge is to Hooff Run (photo 8).
    - Storm water Outfall 007 is located on the west side of the facility (photo 13). Due to the outfall's proximity to storm water Outfall 003 and storm water Outfall 005, the drainage area is considered a combined 8.45 acres for all three outfalls. The drainage area consists of paved surfaces with numerous drop inlets associated with non-industrial areas of the facility (photos 14 – 16). Discharge is to Hooff Run (photo 8).
    - Storm water Outfall 009 is located on the west side of the facility (photo 17). The drainage area to this outfall is 2.19 acres which consists of paved surfaces adjacent to the BNR/UV area of the facility (photos 18 – 21). Discharge is to Hooff Run (photo 22).

- Storm water Outfall 011 is located on the southwest corner of the facility (photo 23). The drainage area to this outfall is 3.90 acres which consists of primarily paved surfaces (photos 24 – 25). At the time of the site visit, construction activities were taking place within a portion of the drainage area to this outfall. Any potential impact to the receiving stream from curb inlets located within the construction area was addressed through the use of inlet protection. Discharge is to Hooff Run.

- Storm water Outfall 013 is located on the south central portion of the facility (photo 26). The drainage area to this outfall is 4.10 acres which consists of primarily paved surfaces (photos 27 – 28). Due to the proximity of the construction activities associated with storm water Outfall 011, all curb inlets within the drainage area of Outfall 013 also have inlet protection. Discharge is to a rocky bowl shaped sedimentation basin which ultimately discharges to Hunting Creek under Interstate 495.

- Storm water Outfall 015 is located on the east side of the facility (photo 29). The drainage area to this outfall is 7.74 acres which consists of paved surfaces adjacent to the preliminary and primary treatment areas of the facility (photo 30). Additionally, the Alexandria Fire Department utilizes this area for fire training purposes (photos 31 – 33). In accordance with 9VAC25-151-70 (Part I.B.I), discharges from firefighting activities are considered an allowable non-storm water discharge source. It is recommended that all curb inlets associated with the fire training area be provided a form of protection to minimize any potential impacts from the fire fighting training area. Discharge is to the City of Alexandria Municipal Separate Storm Sewer System (MS4).

- Areas of potential storm water contamination include the chemical loading/unloading area (photo 34) and solids handling areas. Storm water from these areas is returned to the headworks. As such, there is no reasonable potential for these areas to impact storm water quality.

Staff Recommendations

The requirements found within 9VAC25-151 are applicable to point source storm water discharges associated with industrial activity. Based on observations made during the site visit, it is staff's best professional judgement that there is no reasonable potential for the industrial activity at the Alexandria Renew Enterprises Water Resources Recovery Facility to impact storm water quality. Storm water discharges are comprised primarily of runoff from paved and grassy areas. Discharges such as this are currently exempt from coverage under the general industrial storm water permit. Any areas of potential storm water contamination are returned to the headworks thereby not impacting storm water quality.

The facility maintains coverage under the VPDES General Permit for Storm Water Discharges Associated with Industrial Activity (VAR051503). Pursuant to 9VAC25-151-50 C, an owner covered by the VPDES General Permit for Storm Water Discharges Associated with Industrial Activity who is later able to file a no-exposure certification to be excluded from permitting is no longer authorized by nor required to comply with this permit. Additionally, if the owner is no longer required to have permit coverage due to a no-exposure exclusion, the owner is not required to submit a notice of termination. Please note that if a discharge arises in accordance with 9VAC25-31-100, Application for a Permit, Alexandria Renew Enterprises Water Resources Recovery Facility shall be responsible for complying with Virginia State Water Control Law and Regulations. Additionally, coverage may be necessary at a later date should changes to regulations be implemented or site activities change.

Photo 1. Storm water Outfall 003. Flow is in the direction of the arrow to Hooff Run.

Photo 2. Drop inlet associated with storm water Outfall 003 upstream of final discharge point to Hooff Run. Subsurface flow is in the direction of the arrow.

Photo 3. Drainage area to storm water Outfall 003.

Photo 4. Drainage area to storm water Outfall 003.

Photo 5. Drainage area to storm water Outfall 003.

Photo 6. Drainage area to storm water Outfall 003.

Photo 7. Drainage area to storm water Outfall 003.

Photo 8. Hooff Run. Flow from storm water Outfall 003, Outfall 005 and Outfall 007 that has entered the receiving stream is in the direction of the arrow.

Photo 9. Storm water Outfall 005. Flow is in the direction of the arrow to Hooff Run.

Photo 10. Drop inlets associated with storm water Outfall 005 upstream of final discharge point to Hooff Run. Subsurface flow is in the direction of the arrow.

Photo 11. Drainage area to storm water Outfall 005.

Photo 12. Drainage area to storm water Outfall 005.

Photo 13. Storm water Outfall 007. Flow is in the direction of the arrow to Hooff Run.

Photo 14. Drop inlet associated with storm water Outfall 007 upstream of final discharge point to Hooff Run. Subsurface flow is in the direction of the arrow.

Photo 15. Drainage area to storm water Outfall 007.

Photo 16. Drainage area to storm water Outfall 007.

Photo 17. Storm water Outfall 009. Flow is in the direction of the arrow to Hooff Run.

Photo 18. Drainage area to storm water Outfall 009.

Photo 19. Drainage area to storm water Outfall 009.

Photo 20. Drainage area to storm water Outfall 009.

Photo 21. Drainage area to storm water Outfall 009.

Photo 22. Hooff Run at discharge point of storm water Outfall 009.

Photo 23. General vicinity of storm water Outfall 011.

Photo 24. Drainage area to Outfall 011. The arrow points to the approximate location of the outfall.

Photo 25. Drainage area to storm water Outfall 011.

Photo 26. Small rocky retention basin associated with discharge from storm water Outfall 013.

Photo 27. Drainage area to storm water Outfall 013.

Photo 28. Drainage area to storm water Outfall 013.

Photo 29. The arrow points to storm water Outfall 015.

Photo 30. Drainage area to storm water Outfall 015.

Photo 31. Alexandria Fire Department drainage area to storm water Outfall 015.

Photo 32. Alexandria Fire Department drainage area to storm water Outfall 015.

Photo 33. Alexandria Fire Department drainage area to storm water Outfall 015.

Photo 34. Chemical loading/unloading area.

ATTACHMENT 3

Facility Schematic/Diagram

PROCESS FLOW STREAM IDENTIFICATION NUMBER

MAIN PROCESS FLOW STREAMS

1. RAW SEWAGE
2. PLANT DRAIN
3. PRIMARY INFLUENT
4. PRIMARY EFFLUENT
4A. BIOLOGICAL REACTOR BASIN INFLUENT
4B. PRIMARY EFFLUENT TO NMTs OR FROM NMTs TO BRBs
5. SECONDARY EFFLUENT
6. TERTIARY EFFLUENT
7. FILTER EFFLUENT
8. PLANT EFFLUENT

SOLIDS PROCESS FLOW STREAMS

9. PRIMARY SLUDGE
10. WASTE ACTIVATED SLUDGE
11. TERTIARY SLUDGE
12. GRAVITY THICKENED SLUDGE
13. CENTRIFUGE THICKENED PRIMARY SLUDGE
14. BLENDED SLUDGE
15. BLENDED THICKENED SLUDGE
16. DIGESTER FEED SLUDGE
16A. THICKENED SCREENED SLUDGE
16B. PASTEURIZED SLUDGE
17. DIGESTED SLUDGE
18. DEWATERED SLUDGE
19. BIOSOLIDS TO LANDFILL

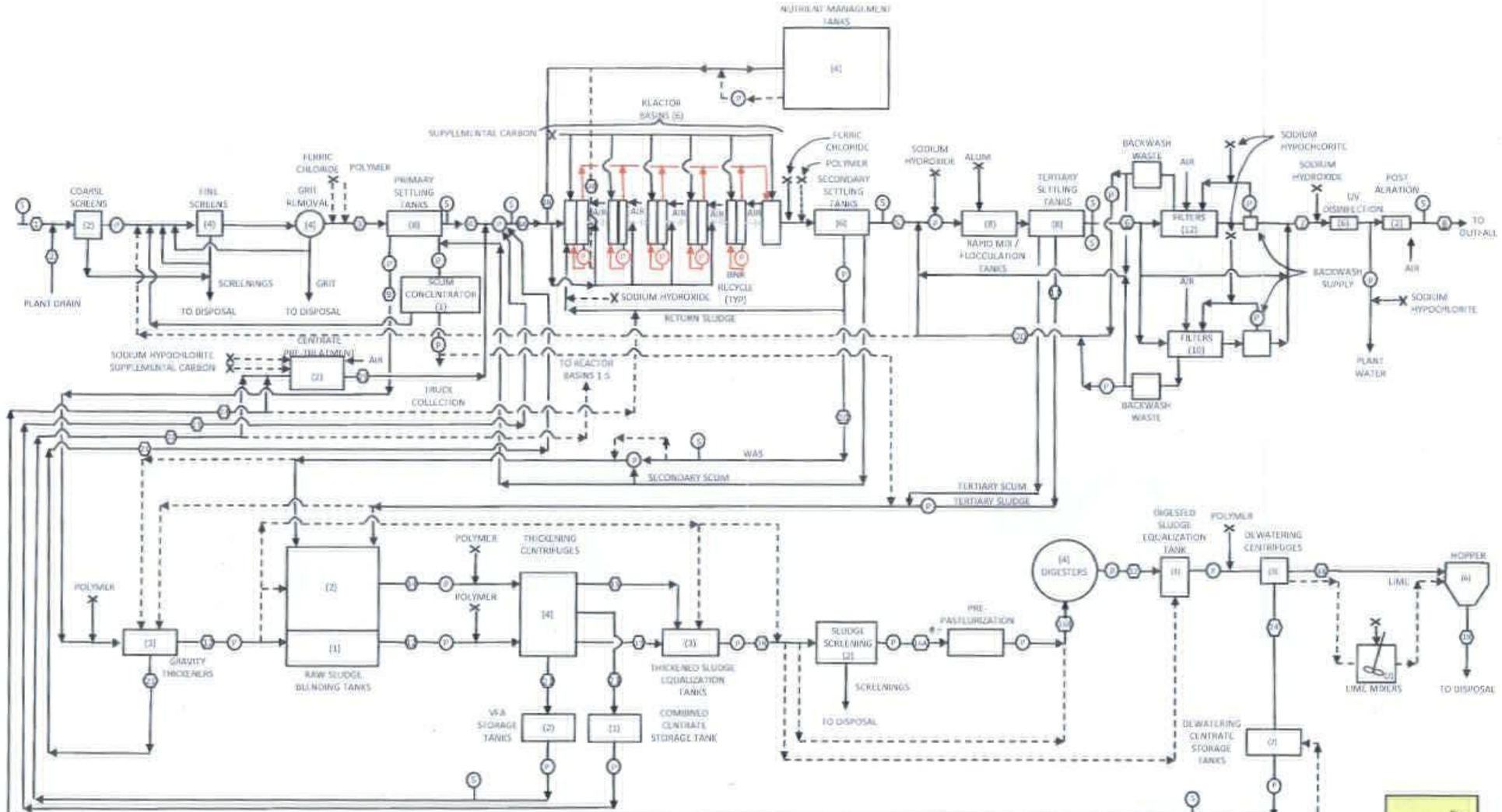
RECYCLE FLOW STREAMS

20. FILTER BACKWASH
21. GRAVITY THICKENER OVERFLOW
22. VFA RECYCLE
23. THICKENING CENTRATE
24. DEWATERING CENTRATE
25. CENTRATE PRETREATMENT EFFLUENT

LEGEND

- PROCESS FLOW STREAM (#=IDENTIFICATION NUMBER)
- PRIMARY CHEMICAL ADDITION POINT
- ALTERNATIVE CHEMICAL ADDITION POINT
- ALTERNATIVE PLANT STREAM RECYCLE
- PUMPING SYSTEM
- AUTOMATIC COMPOSITE SAMPLER
- FACILITIES (#=NO. OF UNITS)

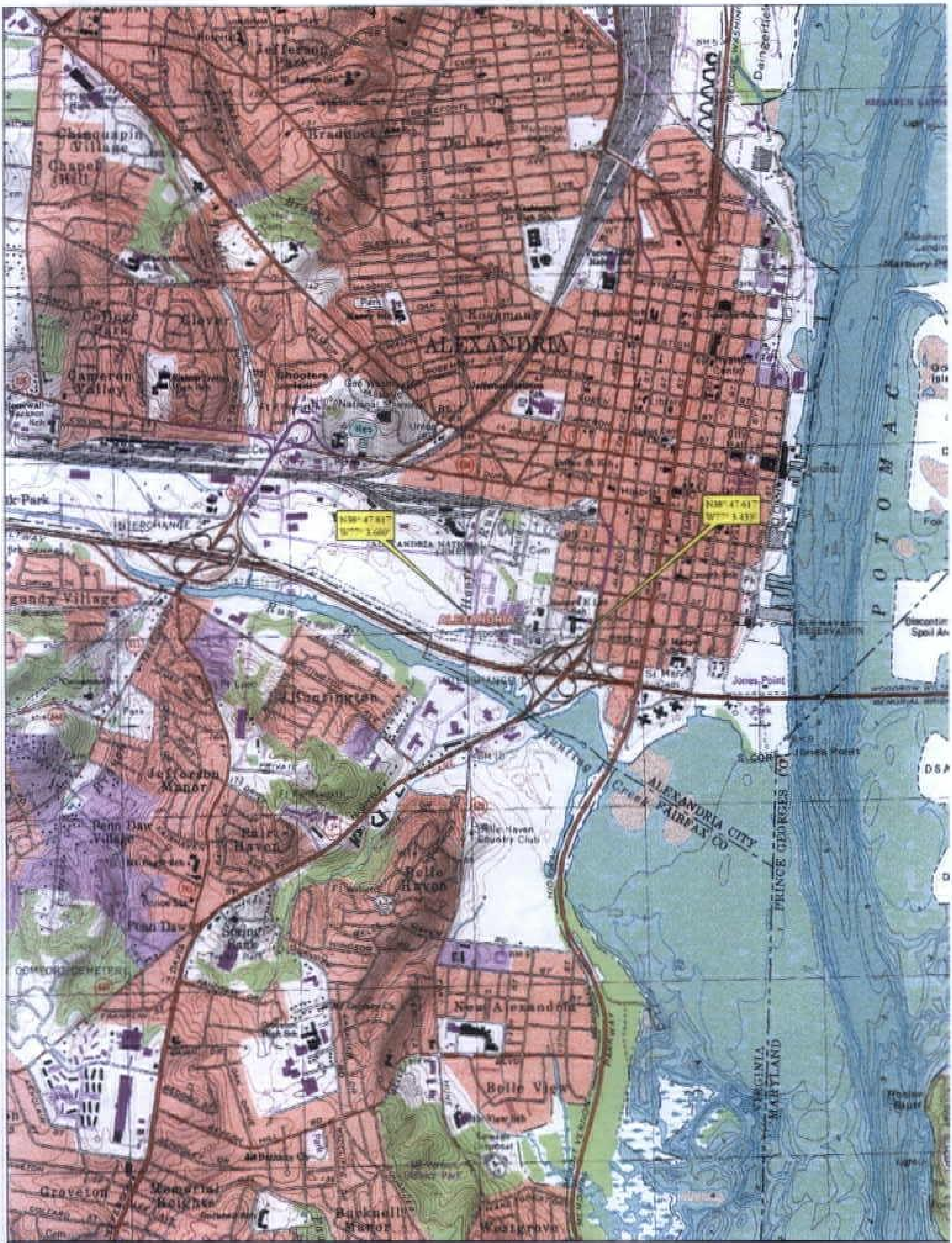
Attachment for Section B.3
Process Flow Diagram A
Step Feed Mode



Attachment for Section B.3
Process Flow Diagram B
MLE Mode

ATTACHMENT 4

Topographic Map



ATTACHMENT 5

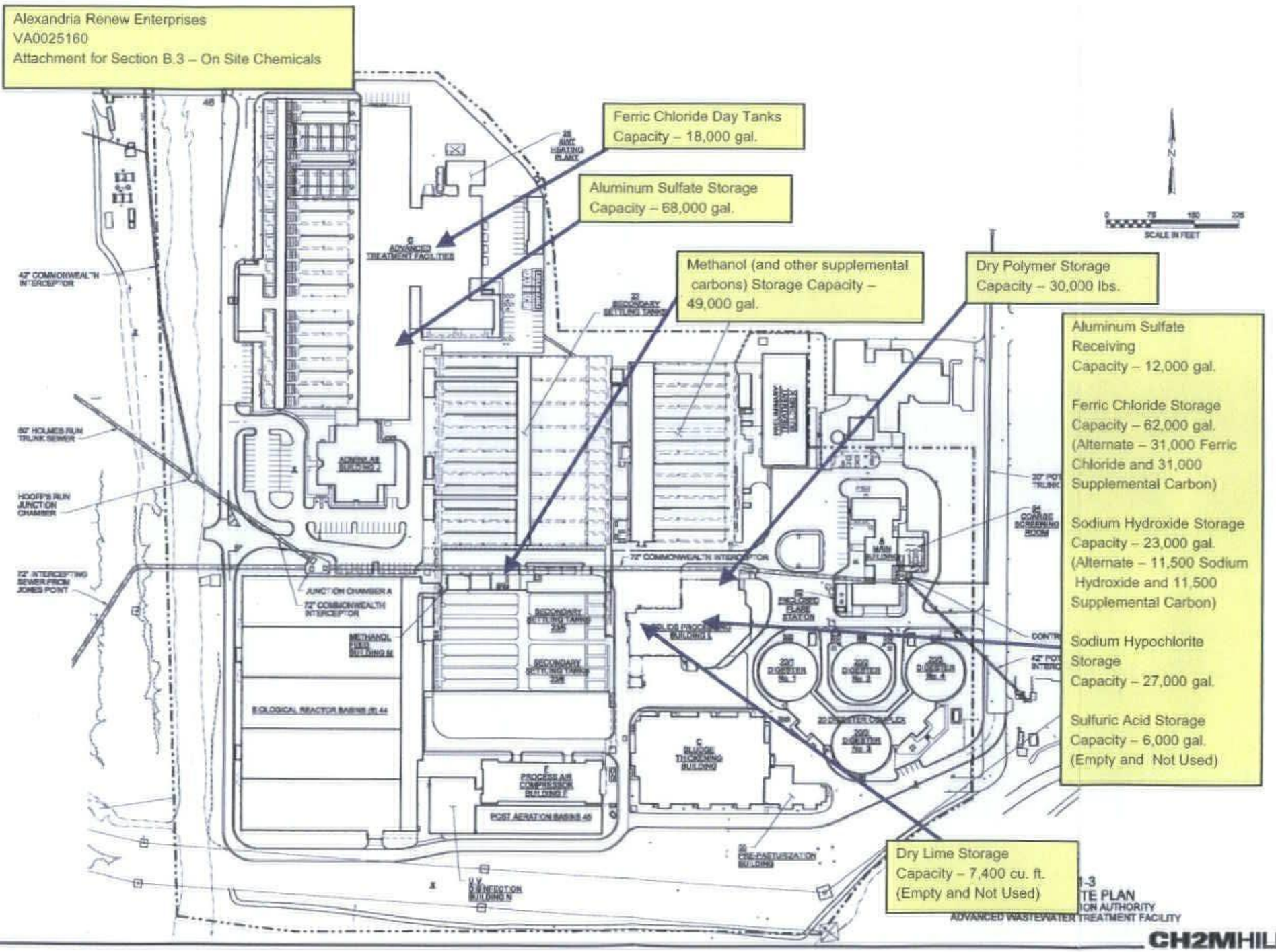
Onsite Chemicals and Storage Locations

Alexandria Renew Enterprises
VA0025160
Attachment for Section B.3 – On Site Chemicals

AlexRenew Process Chemical Storage			
Chemical	Location[1]	Maximum Storage	**Spill Prevention**
Aluminum Sulfate Receiving	Basement of Building L, Solids Processing Building	Two Receiving Tanks Tank Capacity – 6,000 gal. Maximum Storage – 12,000 gal.	**Receiving tanks inside spill containment area. The containment area is sized to hold 1.5 times the volume of one tank. The containment area is equipped with an air operated diaphragm spill pump. Spills are manually pumped to the plant influent or returned to storage. Alarm provided for spill detection.**
Aluminum Sulfate Storage	Basement of Building G2, Advanced Treatment Building	Five Storage Tanks Tank Capacity - 13,600 gal. Maximum Storage - 68,000 gal.	**Storage tanks inside spill containment area. The containment area is sized to hold 1.5 times the volume of one tank. The containment area is equipped with an air operated diaphragm spill pump. Spills are manually pumped to the plant influent. Alarm provided for spill detection.**
Ferric Chloride Storage	Basement of Building L, Solids Processing Building	Four Storage Tanks Tank Capacity – 15,500 gal. Maximum Storage – 62,000 gal.	**Storage tanks inside spill containment area. The containment area is sized to hold 1.5 times the volume of one tank. The containment area is equipped with an air operated diaphragm spill pump. Spills are manually pumped to the plant influent. Alarm provided for spill detection.**
Ferric Chloride Day Tanks	Basement of Building G2, Advanced Treatment Building	Three Day Tanks Tank Capacity – 6,000 gal. Maximum Storage – 18,000 gal.	**Day tanks inside spill containment area. The containment area is sized to hold 1.5 times the volume of one tank. The containment area is equipped with an air operated diaphragm spill pump. Spills are manually pumped to the plant influent. Alarm provided for spill detection.**
Lime, Dry	Building L, Solids Processing Building	Two Storage Tanks Tank Capacity – 3,700 cu. ft. Approximately 260,000 lbs. Maximum Storage – 7,400 cu. ft. Approximately 520,000 lbs.	**The storage Tank area drains return to the plant influent.**
Methanol	Adjacent to BNR and Secondary Settling	Two Storage Tanks Tank Capacity – 24,500 gal. Maximum Storage – 49,000 gal.	**Storage tanks inside spill containment area. The containment area is equipped with an air operated diaphragm spill pump. Spills are manually pumped to the plant influent or returned to storage. Alarm provided for spill detection.**
Polymer, Dry	Building L, Solids Processing Building	Maximum Storage – 30,000 lbs.	**Mix units curbed with drains returning to the plant influent.**
Sodium Hydroxide	Basement of Building L, Solids Processing Building	Two Storage Tanks Tank Capacity – 11,500 gal. Maximum Storage – 23,000 gal.	**Storage tanks inside spill containment area. The containment area is sized to hold 1.5 times the volume of one tank. The containment area is equipped with an air operated diaphragm spill pump. Spills are manually pumped to the plant influent or returned to storage. Alarm provided for spill detection.**
Sodium Hypochlorite	Basement of Building L, Solids Processing Building	Two Storage Tanks Tank Capacity – 13,500 gal. Maximum Storage – 27,000 gal.	**Storage tanks inside spill containment area. The containment area is sized to hold 1.5 times the volume of one tank. The containment area is equipped with an air operated diaphragm spill pump. Spills are manually pumped to the plant influent or returned to storage. Alarm provided for spill detection.**
Sulfuric Acid	Basement of Building L, Solids Processing Building	Two Storage Tanks Tank Capacity – 3,000 gal. Maximum Storage – 6,000 gal.	**Storage tanks inside spill containment area. The containment area is sized to hold 1.5 times the volume of one tank. The containment area is equipped with an air operated diaphragm spill pump. Spills are manually pumped to the plant influent or returned to storage. Alarm provided for spill detection.**

1 – See attached Site Plan for specific storage location.

Alexandria Renew Enterprises
VA0025160
Attachment for Section B.3 – On Site Chemicals



B-3
TE PLAN
ION AUTHORITY
ADVANCED WASTEWATER TREATMENT FACILITY

CH2MHILL

ATTACHMENT 6

DEQ-NRO Inspection Report

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3821
www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

April 10, 2012

Karen Pallansch
General Manager
Alexandria Sanitation Authority (ASA)
1500 Eisenhower Ave
Alexandria, VA. 22314

Re: **Alexandria Sanitation Authority Advanced Wastewater Treatment Plant**
Permit #VA0025160

Dear Ms. Pallansch:

Attached is a copy of the Inspection Report generated from the Technical and Laboratory inspection conducted at the Alexandria Sanitation Authority – Advanced Waste Water Treatment Plant (WWTP) on March 15, 2012. I would like to thank you for your time and assistance during this inspection. This letter is not intended as a case decision under the Virginia Administrative Process Act, Va. Code § 2.2-4000 *et seq.* (APA).

Please review the enclosed report and submit in writing adequate documentation of all measures taken (including all necessary supporting documentation) to address the Request for Corrective Action no later than May 10, 2012.

Your response may be sent either via the US Postal Service or electronically, via E-mail. If you choose to send your response electronically, we recommend sending it as an Acrobat PDF or in a Word-compatible, write-protected format. Additional inspections may be conducted to confirm that the facility is in compliance with permit requirements.

If you have any questions or comments concerning this report, please feel free to contact me at the Northern Regional Office at (703) 583-3882 or by e-mail at Sharon.Allen@deq.virginia.gov.

Sincerely,

Sharon Allen

Sharon Allen
Environmental Specialist II

cc: Permits / DMR File

Electronic copy sent:
Compliance Manager, Compliance Auditor – DEQ
James Sizemore- ASA AWWTP, Quality Services Manager

DEQ
WASTEWATER FACILITY INSPECTION REPORT
PREFACE

VPDES/State Certification No.	(RE) Issuance Date	Amendment Date	Expiration Date
VA0025160	**June 1, 2009**		**May 31, 2014**

Facility Name	Address	Telephone Number
ASA Advanced Wastewater Treatment Plant	**1500 Eisenhower Ave Alexandria, VA. 22314**	**703-549-3382**
Owner Name	Address	Telephone Number
Alexandria Sanitary Authority (ASA)	**1500 Eisenhower Ave Alexandria, VA. 22314**	**703-549-3382**
Responsible Official	Title	Telephone Number
Karen Pallansch	**General Manager**	**703-549-3382**
Responsible Operator	Operator Cert. Class/number	Telephone Number
James Sizemore	**Class I; 1965004291**	**703-549-3382 ext 2275**

TYPE OF FACILITY:

DOMESTIC				**INDUSTRIAL**			
Federal		Major	X	Major		Primary	
Non-federal	X	Minor		Minor		Secondary	

INFLUENT CHARACTERISTICS:	DESIGN:
Flow	**54 MGD**
Population Served	**~325,000**
Connections Served	**~26,000 in Alexandria not tracked in Fairfax**
BOD_5 (Feb 2011-Feb 2012)	**~227**
TSS (Feb 2011-Feb 2012)	**~307**

EFFLUENT LIMITS: mg/L unless otherwise specified **Outfall 001 and 002 have the same limits other than TRC. Outfall 002 is an emergency outfall and has not been used in recent years.**

Parameter	Min.	Avg.	Max.	Parameter	Min.	Avg.	Max.
pH, s.u.	**6.0**		**9.0**	**DO**	**6.0**		
cBOD5		**5**	**8**	**TSS**		**6.0**	**9.0**
Ammonia-N (Apr-Oct)		**1.0**	**4.4**	**Ammonia-N (Nov-Jan)**		**8.4**	**10**
Ammonia-N (Feb-Mar)		**6.9**	**8.5**	**E. coli n/100 ml**		**126**	
Total Phosphorous		**0.18**	**0.27**	**TRC (outfall 002 only)**		**.009**	**.011**

Receiving Stream	**Hunting Creek**
Basin	**Potomac River**
Discharge Point (LAT)	**36° 47' 33" N**
Discharge Point (LONG)	**77° 03' 26" W**

Problems identified at last inspection: September 23, 2010	Corrected	Not Corrected
1. There was a clogged drain in the pre-pasteurization heat exchange process room. This issue was not affecting the unit process. This is a safety hazard and should be addressed immediately.	**[X]**	[ ]

The cause of the standing water was found to be a leaking heat recirculation pump seal. The pump was rebuilt and the leak stopped.

SUMMARY March 2012

COMMENTS:

- The overall condition of the plant was orderly and well maintained.
- One incident at the plant has been reported to DEQ since the last technical inspection in September 2010. This was an unplanned bypass of primary effluent around secondary treatment that resulted from high influent flows resulting from Tropical Storm Lee in September 2011.
- DEQ inspections have often been conducted in the late winter /spring of the year (February 2003, February 2005, May 2006, March 2007, September 2010, and March 2012). Since at least 2005, heavy algal growth has been noted in the secondary clarifiers and on the weirs. While this algal growth does not appear to have an impact on the final effluent water quality, it does indicate an ongoing issue. ASA's response has typically been that weir cleaning was increased, although the frequency seems to have remained the same over the years at once a week in summer and less in winter. Given the amount of algae seen in late winter/spring, weirs should probably be cleaned at least once per week year round. Finding a way to reduce the impact of direct sunlight on the clarifiers could also help reduce the amount of algae growth.
- Heavy foam attributed to Nocardia (filamentous bacteria) has been noted in the Biological Reactor Basins (BRBs) during several inspections (site inspection in February 2004, and technical inspections in May 2006, and March 2012). In March 2010, a combination of excess foaming and high influent flows resulted in an overflow of foam from the BNR Basins to the plant stormwater collection system, and about 50 gallons of foam was discharged to Hooffs Run. Review of troubleshooting materials indicates that the primary causes of excessive Nocardia are warm temperatures, excessive grease, and extended sludge age.
- ASA staff is looking into Integrated Pest Control methods to control both spiders and bird pest problems at the outdoor process units.
- The facility has several new environmental education projects in place:
  - Solar panels have been installed on the south face of Building A (photo 2). Mr. Sizemore said they plan to have information on energy production from the panels transmitted to a visitor display in the main office building.
  - The waste flare for the sludge pasteurization process has been replaced with a dual fuel flare that can run off of either natural gas or digestor gas.
  - ASA has partnered with a local group to have a demonstration garden planted on site near Building A that will use the plant's Class A biosolids for fertilizer (photo 3).

REQUEST for CORRECTIVE ACTION:

- **The UV intensity reading for one of the in-service banks read 14.0 mW/cm^2 at the time of this inspection. A number this high is likely to erroneous. Please let DEQ know if a problem was found and, if so, how it was corrected.**

- **During the May 2006 inspection, ASA AWWTP staff stated that they were looking into cost efficiency of covering the clarifiers to reduce algae growth and reduce maintenance time. Please let DEQ know if this solution was considered feasible, and if not, what alternative may be used. Because weekly manual cleaning of the weirs appears insufficient, and because manual cleaning is labor intensive, consideration of alternative ways of reducing algae growth should be revisited.**

- **While foam from Nocardia tends to be a warm weather problem, at this facility it appears to be more of a problem during colder seasons. While a hypochlorite spray system for foam control is installed and used when needed, the persistence of the problem indicates that other options for reducing Nocardia growth should be explored.**

Virginia Department of Environmental Quality

FOCUSED CEI TECH/LAB INSPECTION REPORT

FACILITY NAME: Alexandria Sanitation Authority AWWTP		**INSPECTION DATE:**	March 15, 2012
		INSPECTOR	S. Allen
PERMIT No.: VA0025160		**REPORT DATE:**	April 10, 2012
TYPE OF FACILITY: ☑ Municipal ☑ Major ☐ Industrial ☐ Minor ☐ Federal ☐ Small Minor ☐ HP ☐ LP		**TIME OF INSPECTION:**	Arrival 0945 / Departure 1300
		TOTAL TIME SPENT (including prep & travel)	**30 hours**
PHOTOGRAPHS: ☑ Yes ☐ No		**UNANNOUNCED INSPECTION?**	☑ Yes ☐ No
REVIEWED BY / Date: 4/10/12			
PRESENT DURING INSPECTION: Jim Sizemore – ASA AWWTP			

TECHNICAL INSPECTION

1. Has there been any new construction? • If so, were plans and specifications approved? Comments: **Package A CTC approved 4-23-2010, CTO inspection (J. Desai) scheduled for 3-29-12.** **Package B CTC approved 2-8-11** **Package D CTC approved 5-13-11** **Magnesium hydroxide system CTC approved 5-26-2010**	☑ Yes ☐ No
2. Is the Operations and Maintenance Manual approved and up-to-date? Comments: **updated June 2010**	☑ Yes ☐ No
3. Are the Permit and/or Operation and Maintenance Manual specified licensed operator requirements being met? Comments:	☑ Yes ☐ No
4. Are the Permit and/or Operation and Maintenance Manual specified operator staffing requirements being met? Comments:	☑ Yes ☐ No
5. Is there an established and adequate program for training personnel? Comments:	☑ Yes ☐ No
6. Are preventive maintenance task schedules being met? Comments:	☑ Yes ☐ No
7. Does the plant experience any organic or hydraulic overloading? Comments: **Plant receives higher flows during rain events due to a section of combined sanitary/stormwater sewer in Old Town Alexandria. Plant processes have been sized to absorb higher flows when necessary.**	☑ Yes ☐ No

TECHNICAL INSPECTION

8. Have there been any bypassing or overflows since the last inspection? Comments: **The plant experienced excessive wet weather flows on Sept 8-9 2011, due to rainfall from Tropical Storm Lee. On Sept 9, 2012, several flow pumps shut down briefly, resulting in 325,000 gallons of influent bypassing the secondary treatment system (photo 4). This water mixed with secondary effluent and did receive tertiary treatment and UV disinfection. While results of several laboratory analyses on the final effluent were slightly elevated, no permit limits were exceeded.**	☑ Yes ☐ No
9. Is the standby generator (including power transfer switch) operational and exercised regularly? **NA** Comments: **Two independent power sources**	☐ Yes ☐ No
10. Is the plant alarm system operational and tested regularly? Comments:	☑ Yes ☐ No
11. Is sludge disposed of in accordance with the approved sludge management plan? Comments: **Class A sludge is land applied. SMP updated May 2010.**	☑ Yes ☐ No
12. Is septage received? • If so, is septage loading controlled, and are appropriate records maintained? Comments:	☐ Yes ☑ No
13. Are all plant records (operational logs, equipment maintenance, industrial waste contributors, sampling and testing) available for review and are records adequate? Comments:	☑ Yes ☐ No

14. Which of the following records does the plant maintain?

☑ Operational logs ☑ Instrument maintenance & calibration

☑ Mechanical equipment maintenance ☑ Industrial Waste Contribution (Municipal facilities)

Comments:

15. What does the operational log contain?

☑ Visual observations ☐ Flow Measurement ☑ Laboratory results ☑ Process adjustments

☐ Control calculations ☐ Other (specify) | multiple operator logs at the different process buildings

Comments:

16. What do the mechanical equipment records contain?

☑ As built plans and specs ☑ Manufacturers instructions ☑ Lubrication schedules

☑ Spare parts inventory ☑ Equipment/parts suppliers

☐ Other (specify)

Comments:

17. What do the industrial waste contribution records contain (Municipal only)?

☑ Waste characteristics ☐ Impact on plant ☑ Locations and discharge types

☐ Other (specify)

Comments:

18. Which of the following records are kept at the plant and available to personnel?

☑ Equipment maintenance records ☑ Operational log ☑ Industrial contributor records

☑ Instrumentation records ☑ Sampling and testing records

Comments:

19. List records not normally available to plant personnel and their location:

Comments: **NA**

20. Are the records maintained for the required time period (three or five years)? Comments: **Records kept for at least 10 years.**	☑ Yes ☐ No

VA DEQ Focused CEI Tech/Lab Inspection Report

Permit #	VA0025160

UNIT PROCESS EVALUATION SUMMARY SHEET

UNIT PROCESS	APPLICABLE	PROBLEMS*	COMMENTS
Sewage Pumping	Y		
Flow Measurement (Influent)	Y		*Influent flow meters calibrated 10-14-11*
Screening/Comminution	Y		
Grit Removal	Y		
Oil/Water Separator			
Flow Equalization			
Ponds/Lagoons			
Imhoff Tank			
Primary Sedimentation	Y		*Continuing struggle to keep birds out of the primary clarifiers. Staff tries new techniques and each lasts a while, and then the birds get used to it. Birds were not seen in the clarifiers on this visit.*
Trickling Filter			
Septic Tank and Sand Filter			
Rotating Biological Contactor			
Activated Sludge Aeration			
Biological Nutrient Removal	Y		*Four of five BNR tank in service. Thick foam (Nocardia) was seen in the tanks, but Mr. Sizemore said it had not been as bad as in most winters.*
Sequencing Batch Reactor			
Secondary Sedimentation	Y	1	*The secondary settling basins had mats of floating algae and the clarifiers had a lot of algal growth along the weirs, likely affected by mild winter and warm, sunny March. Operators were out cleaning the weirs while I was on site.*
Flocculation			*Alum is added to secondary effluent aid in TP removal*
Tertiary Sedimentation	Y		*Fish noted in the plate filter tanks and tertiary effluent channel.*
Filtration	Y		
Micro-Screening			
Activated Carbon Adsorption			
Chlorination			
Dechlorination			
Ozonation			
Ultraviolet Disinfection	Y		*Two channels are run preferentially; the other four come on as needed based on plant flow.*
Post Aeration	Y		
Flow Measurement (Effluent)			*Effluent flow is currently measured by subtracting return flows from influent flow (flow from four different influent meters flow is averaged).*
Land Application (Effluent)			
Plant Outfall	Y		*The effluent conduit was inspected July 27, 2011.Plant did not discharge during this inspection; primary effluent was held in an empty Biological Reactor Basin, stopping flow from moving through the plant.*

UNIT PROCESS EVALUATION SUMMARY SHEET (cont)

Sludge Pumping	Y		
Flotation Thickening (DAF)			
Gravity Thickening	Y		
Aerobic Digestion			
Anaerobic Digestion	Y		
Lime Stabilization			
Centrifugation	Y		*Construction Package B is for Centrate Pretreatment. Anticipated in service early 2013.*
Sludge Press			
Vacuum Filtration			
Drying Beds			
Thermal Treatment	Y		
Incineration			
Composting			
Land Application (Sludge)	Y		

* Problem Codes

1. Unit Needs Attention
2. Abnormal Influent/Effluent
3. Evidence of Equipment Failure
4. Unapproved Modification or Temporary Repair
5. Evidence of Process Upset
6. Other (explain in comments)

INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

- The overall condition of the plant was orderly and well maintained.
- There was a thick layer of foam on surface of the water in the Biological Reactor Basins (BRBs). This foam is attributed to Nocardia bacteria.
- There was significant algal growth in the secondary clarifiers.
- Three of the four UV channels were in use. The UV intensity meter display read as follows, in mW/cm^2:

  Unit 4A= 3.1 Unit 5A= 2.5 Unit 6A= 8.2 **Average= 5.6**
  B= 1.6 B= 14.0 B= 4.0

  The O&M manual lists the goal UV intensity to be > 2.8 mW/cm^2. However, the reading of 14.0 mW/cm^2 is unlikely to be a reliable number and the unit should be inspected for problems.
- The facility had many spare bulbs and ballasts on hand for the UV system.
- Construction has begun on the plant's planned upgrades, consisting of 4 projects. DEQ Wastewater Engineer, Jaimini Desai, estimates that the upgrades will take about 4 more years to complete.
  - **Construction package A** for nutrient removal upgrade- methanol storage increased to 23,000 gallons (2 new tanks) from 8,000 gallons (photo 1). Pumping capacity was increased by three times, which allows staff more flexibility in types of carbon that can be fed as food source. **Mr. Desai expects to issue the CTO in April 2012.**
  - **Construction Package B** is for Centrate Pretreatment. Will consist of two Sequencing Batch Reactors (SBRs) to denitrify centrate and remove ammonia prior to returning to BNR basins (photo 9). This project also includes addition of an effluent flow meter. **Anticipated in service early 2013.**
  - **Construction Package C** adds an underground storage reservoir on other side of Hooffs Run (photo 6). This cooperative plan between ASA, the City of Alexandria, and a developer provided for the tank to be buried, topped with artificial turf, and used for soccer fields. **Not started yet.**
  - **Construction Package D** adds a new (6^{th}) BRB that will be anoxic only (photo 5). All plant water will pass through this basin prior to treatment in the other five BNR tanks. **Under construction**

Permit #	VA0025160

LABORATORY INSPECTION

PRESENT DURING INSPECTION: **Leulu Gebremedhin, Pil Kang –ASA AWWTP laboratory**

1. Do lab records include sampling date/time, analysis date/time, sample location, test method, test results, analyst's initials, instrument calibration and maintenance, and Certificate of Analysis?

   ☑ Sampling Date/Time ☑ Analysis Date/Time ☑ Sample Location ☐ Test Method ☐ Test Results

   ☑ Analyst's Initials ☐ Instrument Calibration & Maintenance

   ☐ Chain of Custody ☐ Certificate of Analysis

2.	Are Discharge Monitoring Reports complete and correct? Month(s) reviewed: February 2012	☑ Yes ☐ No
3.	Are sample location(s) according to permit requirements (after all treatment unless otherwise specified)?	☑ Yes ☐ No
4.	Are sample collection, preservation, and holding times appropriate; and is sampling equipment adequate?	☑ Yes ☐ No
5.	Are grab and composite samples representative of the flow and the nature of the monitored activity?	☑ Yes ☐ No
6.	If analysis is performed at another location, are shipping procedures adequate? List parameters and name & address of contract lab(s): **<u>Sludge samples are sent out :</u>** **<u>Salmonella-</u> past samples have been sent to Midwest Laboratories (13611 B St, Omaha, Nebraska 68144) and to Hoosier Midwest Laboratories (HML- 912 West McGulliard, Muncle, IN 47303-1702) in alternating months. Because neither is VELAP certified, these samples will be sent to Microbac in Maryland beginning January 2012.** **<u>Metals and Nutrients</u> - A&L Eastern Laboratories, Inc (7621 Whitepine Rd, Richmond, VA 23237**	☑ Yes ☐ No
7.	Are annual thermometer calibration(s) adequate?	☑ Yes ☐ No

8. Parameters evaluated during this inspection (attach checklists):

   ☐ pH

   ☐ Temperature

   ☐ Total Residual Chlorine

   ☑ Dissolved Oxygen

   ☐ ~~Biochemical Oxygen Demand~~

   ☐ ~~Total Suspended Solids~~

   ☐ Other (specify)

☐ Other (specify)

☐ Other (specify)

Comments: DO is the only parameter conducted in the field.

Permit #	VA0025160

EFFLUENT FIELD DATA:

Flow	MGD	**Dissolved Oxygen**	9.4 mg/L	**TRC (Contact Tank)**	mg/L
pH	6.73 S.U.	**Temperature**	18.9 °C	**TRC (Final Effluent)**	mg/L

Was a Sampling Inspection conducted? ☑ Yes (see Sampling Inspection Report) ☐ No

CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

1. Type of outfall: ☐ Shore based ☐ Submerged Diffuser? ☐ Yes ☐ No

2. Are the outfall and supporting structures in good condition? ☐ Yes ☐ No

3. Final Effluent (evidence of following problems): ☐ Sludge bar ☐ Grease
   ☐ Turbid effluent ☐ Visible foam ☐ Unusual color ☐ Oil sheen

4. Is there a visible effluent plume in the receiving stream? ☐ Yes ☐ No

5. Receiving stream: ☐ No observed problems ☐ Indication of problems (explain below)

Comments:

Outfall not observed due to difficulty in accessing the site, although access is now possible (previously not accessible due to Wilson Bridge Project construction).

ANALYST:	**Pil Kang**	VPDES NO.	**VA0025160**

Parameter: Dissolved Oxygen
Method: Electrode
01/08

Meter: **YSI 50B**

METHOD OF ANALYSIS:

X	18th Edition of Standard Methods-4500-O G
	21st or Online Editions of Standard Methods-4500-O G (01)

	DO is a method defined analyte so modifications are not allowed. [40 CFR Part 136.6]	**Y**	**N**
1)	If samples are collected, is collection carried out with a minimum of turbulence and air bubble formation and is the sample bottle allowed to overflow several times its volume? [B.3]	In situ	
2)	Are meter and electrode operable and providing consistent readings? [3]	X	
3)	Is membrane in good condition without trapped air bubbles? [3.b]	X	
4)	Is correct filling solution used in electrode? [Mfr.]	X	
5)	Are water droplets shaken off the membrane prior to calibration? [Mfr.]	X	
6)	Is meter calibrated before use or at least daily? [Mfr.]	X	
7)	Is calibration procedure performed according to manufacturer's instructions? [Mfr.]	X	
8)	Is sample stirred during analysis? [Mfr.]	In situ	
9)	Is the sample analysis procedure performed according to manufacturer's instructions? [Mfr.]	X	
10)	Is meter stabilized before reading D.O.? [Mfr.]	X	
11)	Is electrode stored according to manufacturer's instructions? [Mfr.]	X	
12)	Is a duplicate sample analyzed after every 20 samples if citing 18th or 19th Edition [1020 B.6] or after every 10 samples for 20th or 21st Edition [Part 1020] Note: Not required for *in situ* samples.		
13)	If a duplicate sample is analyzed, is the reported value for that sampling event, the average concentration of the sample and the duplicate? [DEQ]		
14)	If a duplicate sample is analyzed, is the relative percent difference (RPD) < 20? [18th ed. Table 1020 I; 21st ed. DEQ]		

PROBLEMS:	None noted.

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
SAMPLE ANALYSIS HOLDING TIME/CONTAINER/PRESERVATION CHECK SHEET
Revised 7/05 [40 CFR, Part 136.3, Table II]

FACILITY NAME:	**Alexandrian Sanitation Authority WWTP**	VPDES NO	**VA0025160**	DATE:	**March 15, 2012**

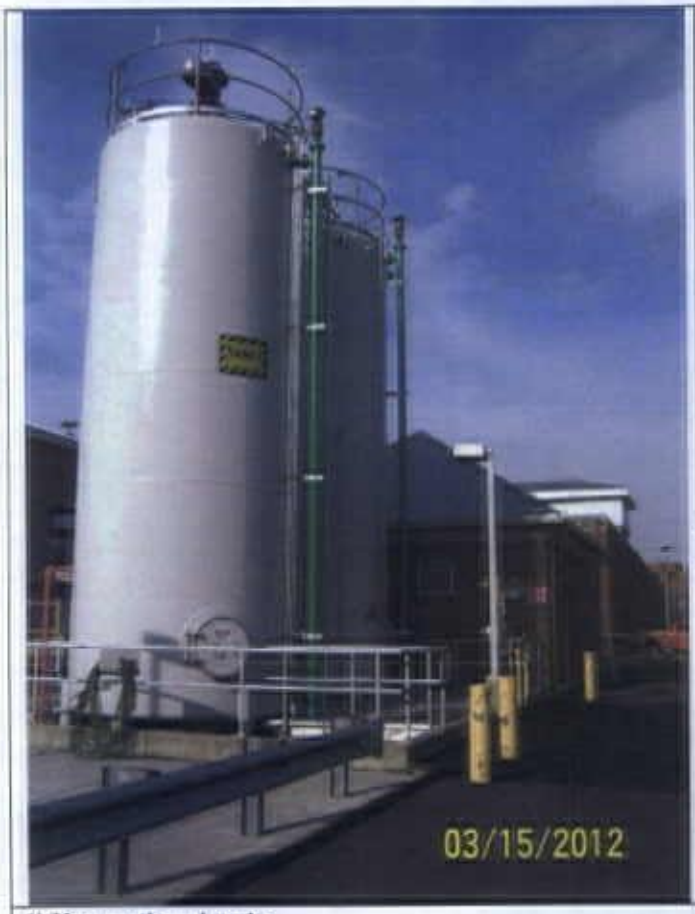
HOLDING TIMES						SAMPLE CONTAINER				PRESERVATION				
PARAMETER	APPROVED	MET?		LOGGED?		ADEQ. VOLUME		APPROP. TYPE		APPROVED	MET?		CHECKED?	
		Y	N	Y	N	Y	N	Y	N		Y	N	Y	N
BOD5 & CBOD5	48 HOURS									ANALYZE 2 HRS or 4° C				
TSS	7 DAYS									4° C				
FECAL COLIFORM / *E. coli / Enterococci*	6 HRS & 2 HRS TO PROCESS									10° C (1 HOUR)+0.008% $Na_2S_2O_3$				
pH	15 MIN.									N/A				
CHLORINE	15 MIN.									N/A				
DISSOLVED 0_2	15 MIN./IN SITU	**X**		**X**		**In situ**				N/A				
TEMPERATURE	IMMERSION STAB.									N/A				
OIL & GREASE	28 DAYS									4° C+H_2SO_4/HCL pH<2				
AMMONIA	28 DAYS									4° C+H_2S0_4 pH<2 DECHLOR				
TKN	28 DAYS									4° C+H_2S0_4 pH<2 DECHLOR				
NITRATE	48 HOURS									4° C				
NITRATE+NITRITE	28 DAYS									4° C+H_2S0_4 pH<2				
NITRITE	48 HOURS									4° C				
PHOSPHATE, ORTHO	48 HOURS									FILTER, 4° C				
TOTAL PHOS.	28 DAYS									4° C+H_2S0_4 pH<2				
METALS (except Hg)	6 MONTHS									HNO_3 pH<2				
MERCURY	28 DAYS									HNO_3 pH<2				

PROBLEMS:	**None noted**	PROBLEMS:	**None noted**

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
EQUIPMENT TEMPERATURE LOG/THERMOMETER VERIFICATION CHECK SHEET
1/08

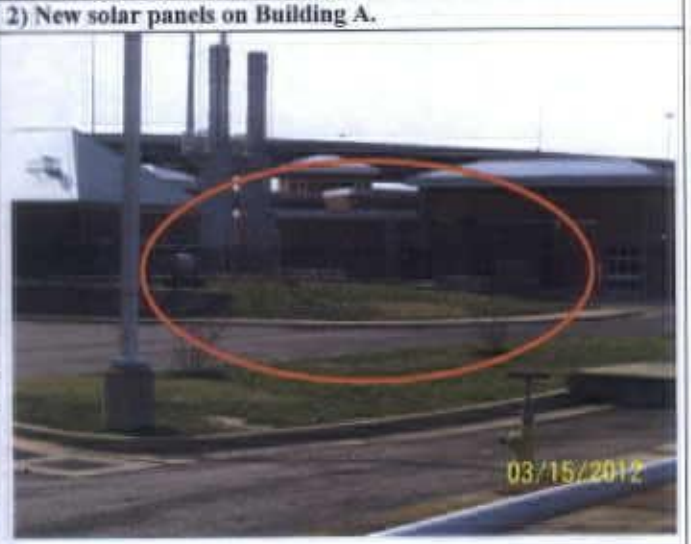
FACILITY NAME:	**Alexandria Sanitation Authority WWTP**	VPDES NO:	**VA0025160**	DATE:	**March 15, 2012**

EQUIPMENT	RANGE	IN RANGE		INSPECT READING °C	CHECK & LOG DAILY		CORRECT INCREMENT		ANNUAL THERMOMETER VERIFICATION				
									Is the NIST / NIST-Traceable Reference Thermometer within the manufacturer's expiration date or recertified yearly?			Y/N	Y
									DATE CHECKED	MARKED		CORR FACTOR	INSPECT TEMP
		Y	N		Y	N	Y	N		Y	N	°C	°C
AUTO SAMPLER	1-6° C	**X**		**Not checked**	**X**		**X**		**Dec 5-6, 2011**	**X**		**- 0.3**	**3.1 – 4.6 °C**
DO METER	± 1° C	**X**		**9.45**	**X**		**X**		**Nov 1, 2011**	**X**		**0.03**	**20 °C**



1) New methanol tanks

2) New solar panels on Building A.



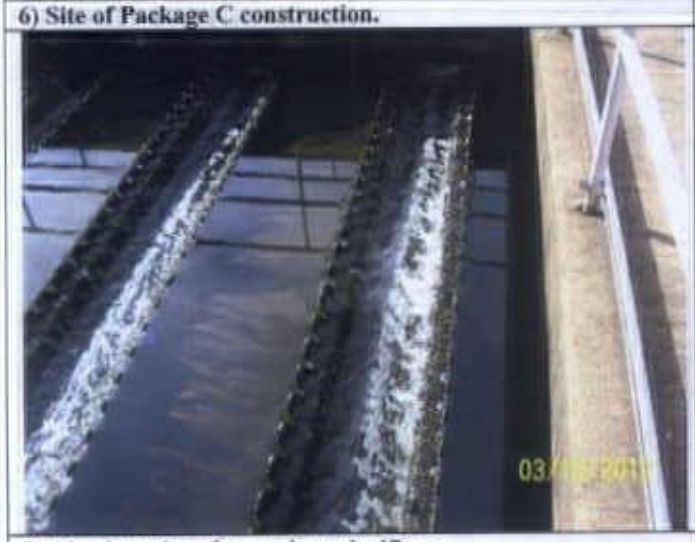
3) Area for planned demo garden.

4) Area of primary influent passive bypass in Sept 2011. Primary effluent flowed from under black curtain on the right (white arrow) in sheet flow (dashed arrow) to secondary effluent channel on left (red arrow). This is a planned passive overflow structure installed for occasions of high flows due to excessive rainfall.

5) Site of 6th BNR basin. Package D.

6) Site of Package C construction.

7) Alga in secondary settling tanks/clarifiers.



8) Alga in weirs of secondary clarifiers.

9) Site of centrate denitrification Package B

10) Final effluent in post aeration tank prior to cascade.

11) Diffusers seen at bottom of post aeration tank.

Facility name: Alexandria Advanced WWTP
Site Inspection Date: March 15, 2012

VPDES Permit No. VA0025160
Photos & Layout by: S. Allen
Page 2 of 2

ATTACHMENT 7

EPA Inspection Report

U.S. Environmental Protection Agency
Office of Compliance and Enforcement
1200 Pennsylvania Avenue, NW
Washington, DC 20460

U.S. Environmental Protection Agency, Region 3
1650 Arch Street
Philadelphia, PA 19103

COMBINED SEWER SYSTEM COMPLIANCE INSPECTION AND ASSESSMENT OF NINE MINIMUM CONTROLS

CITY OF ALEXANDRIA & ALEXANDRIA RENEW ENTERPRISES

INSPECTION REPORT

Inspection Dates:
June 26-27, 2012

Report Date:
December 27, 2012

CONTENTS

EXHIBITS

ATTACHMENTS

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EXECUTIVE SUMMARY

City of Alexandria & Alexandria Renew Enterprises
Compliance with Nine Minimum Controls for the Combined Sewer Collection and Conveyance System and Wastewater Treatment Plant

On June 26 and 27, 2012, an inspection team comprised of staff from U.S. Environmental Protection Agency (EPA) Region 3 and Office of Enforcement and Compliance Assurance (OECA), the State of Virginia Department of Environmental Quality (VADEQ), and EPA contractor PG Environmental, LLC (hereafter, collectively, EPA Inspection Team) inspected the City of Alexandria (hereafter, City) and Alexandria Renew Enterprises (hereafter AlexRenew) combined sewer collection and conveyance system and wastewater treatment plant in Alexandria, Virginia.

The City and AlexRenew provide wastewater conveyance and treatment services to a service population of about 350,000 people within the City of Alexandria as well as unincorporated portions of Fairfax County, Virginia prior to the discharge of effluent to specific waters in the Potomac River Basin. AlexRenew is responsible for the operation and maintenance of the AlexRenew Water Resource Recovery Facility (WRRF), pump stations, interceptors, and combined sewer overflow (CSO) regulators and tide gates. AlexRenew is also the responsible party for the management and implementation of the industrial pretreatment program (IPP). The City is responsible for the operation and maintenance of the collection system mains.

The primary purpose of the inspection was to evaluate the City's and AlexRenew's compliance with the Nine Minimum Controls (NMCs) for the combined sewer system (CSS) as described in EPA's 1994 National Combined Sewer Overflow (CSO) Control Policy and the EPA guidance document titled *Guidance for Nine Minimum Controls* (EPA 832-B-95-003), dated May 1995. As required by Part I, Section E of Virginia Pollutant Discharge Elimination System (VPDES) Permit No. VA0087068 (hereafter, Permit), the City must continue implementation of the NMCs as part of its long-term control plan (LTCP; approved by DEQ in February 1999) and maintain records to demonstrate compliance with the LTCP. A copy of the City Permit is included as Attachment A. AlexRenew's activities are regulated under VPDES Permit No. VA0025160 (administratively extended). A copy of the AlexRenew Permit is included as Attachment B.

The EPA Inspection Team held discussions with City and AlexRenew staff, conducted field verification activities in the collection system and at the WRRF, and obtained pertinent documentation regarding the City's and AlexRenew's implementation of the NMCs. A summary of field activities is included as Exhibit 1.

The EPA Inspection Team noted several observations. These observations are summarized in Table 1.

Table 1. Summary of NMCs and Observations

NMC	Observations
NMC # 1 – Proper operation and regular maintenance programs for the sewer system and CSO outfalls.	1. According to City staff, intrusion is often observed at the Royal Street Regulator for CSO 002 during weekly inspections. Observations such as time, intrusion flow rate, sewer capacity are not being recorded. 2. Based on a comparison of a wet weather event and the AlexRenew standard operating procedures (SOPs), system overflow conditions are not properly documented or inspected in accordance with the current SOPs. AlexRenew's SOPs state that the Four Mile Run Pump Station assets will overflow if the detention tank level reaches 13 feet. At numerous times on September 8 and 9, 2011, the detention tank overflowed at levels between 12.15 and 12.33 feet. 3. A review of the AlexRenew team's High Flow Report dated September 5–10, 2011 identified a number of "Event/Occurrence" entries on September 8, 2011 between 1820 and 2100* concerning flooding, sewer backups, and surcharging.
NMC # 2 – Maximum use of the collection system for storage.	1. The City and AlexRenew do not have a structured approach to evaluate the weir heights within the CSS to maximize storage of wastewater flows in the system. 2. The City and AlexRenew do not have any records or documentation stating the current status of additional storage available within the system. 3. City representatives stated that Fairfax County is not required to conduct inflow and infiltration (I/I) assessments or to reduce I/I, which reduces the potential for storage in the system. 4. The current position and structure of the Hooff's Run Junction Chamber makes this asset vulnerable to flooding and minimizes collection system storage capacity. This junction chamber has been documented to be submerged during wet weather events. The available documentation does not state how much stream water was flowing into the sewer system and reducing system storage capacity. 5. Intrusion into the conveyance system was observed at CSO 002 during the inspection. Intrusion reduces storage in the collection system.
NMC # 3 – Review and modification of pretreatment requirements to ensure CSO impacts are minimized.	1. The Royal St. Bus garage is up gradient of CSO 001; however, the facility has not been evaluated for or directed to make any changes specifically related to reducing or eliminating process water discharges during or after wet weather events to minimize impacts on CSO.
NMC # 4 – Maximization of flow to the publicly owned treatment works for treatment.	1. The Four Mile Run Pump Station had a pumping capacity of 11.4 million gallons per day (mgd); however, its associated force main had a maximum capacity of 9.4 mgd. The capacity of the force main limits maximization of flow to the treatment plant and places higher demand on the stations storage capacity. 2. Intrusion into the conveyance system was observed at CSO 002 during the inspection. Intrusion limits AlexRenew's ability to maximize the conveyance of flow to the WRRF for treatment. 3. Evaluations of wet weather events document a number of times when unpermitted discharges were made out of the Four Mile Run Pump Station while the pump station was pumping less than its design flow capacity. 4. The City does not maintain records to document that they conveyed all wet weather flows to the Publicly Owned Treatment Works (POTW) within the constraints of the CSS and the capacity of the POTW.
NMC # 5 – Elimination of CSOs during dry weather.	1. Dry weather overflows (DWOs) have occurred at CSOs in the conveyance system. The City reported the occurrence of six DWOs in 2009.

Table 1. Summary of NMCs and Observations	
NMC	**Observations**
NMC # 8 – Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts.	1. The EPA Inspection Team observed two discharge locations without signage. One of the discharge locations was reported to be a CSO and the other was a constructed sanitary sewer overflow (SSO).

*NOTE: AlexRenew's records and documentation use a 24-hour clock notation. To maintain consistency, that same notation is used here.

ADDITIONAL OBSERVATIONS

1) An unpermitted CSO structure was observed at the Hooff's Run Junction Structure, which had the potential to discharge directly into Hooff's Run. Based on a review of the two sewer lines flowing into this junction structure, one sanitary sewer line and one currently defined as a combined sewer line, it appeared that this structure serves as both a CSO and as a constructed SSO.

2) A constructed SSO structure was observed at the Four Mile Run Pump Station. This structure has the potential to discharge into Four Mile Run from the pump station's service chambers and the wet weather storage tanks.

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I. INTRODUCTION

On June 26 and 27, 2012 a compliance inspection team comprised of staff from Environmental Protection Agency (EPA) Region 3 and Headquarters, Virginia Department of Environmental Quality (DEQ) and EPA contractor, PG Environmental, LLC, inspected the City of Alexandria (City) and Alexandria Renew Enterprises (hereafter AlexRenew, formerly the Alexandria Sanitation Authority) combined sewer collection system and wastewater treatment plant in Alexandria, Virginia. The purpose of the inspection was to evaluate the City's and AlexRenew's compliance with the Nine Minimum Controls (NMCs) for the combined sewer system (CSS) as described in EPA's 1994 National Combined Sewer Overflow (CSO) Control Policy and EPA's guidance document titled *Guidance for Nine Minimum Controls (EPA 832-B-95-003)*, dated May 1995. As required by Part I, Section E of VPDES Permit No. VA0087068 (hereafter, Permit), the City must continue implementation of the NMCs as part of its long-term control plan (LTCP; approved by DEQ in February 1999) and maintain records to demonstrate compliance with the LTCP.

The compliance inspection included the following major activities:

- Discussions with representatives from the City and AlexRenew regarding the operation of the sewer collection system, wastewater treatment plant, permitted CSOs, and the industrial pretreatment program (IPP).
- A physical inspection of AlexRenew Water Resource Recovery Facility (WRRF).
- A physical inspection of four CSOs and their associated control structures (see Exhibit 1 for a summary of field activities).
- Evaluation of AlexRenew's operational procedures for the WRRF and the interceptor/trunk sewer system during wet weather events.
- Verification of the City's and AlexRenew's adherence to the requirements for implementation of the NMCs as outlined in Virginia Pollutant Discharge Elimination System (VPDES) permit (VA0087068) issued January 17, 2007.

Section III of this report summarizes the observations and findings of the inspection. Section IV identifies additional findings noted during the inspection.

The following personnel were involved in the inspection:

City of Alexandria:	Lalit Sharma, Division Chief - Environmental Quality Yon Lambert, Deputy Director - Operations Emily Baker, City Engineer Jesse Maines, Senior Environmental Specialist Erin Bevis-Carver, Civil Engineer III Jeremy Hassan, Water Quality Compliance Specialist
Alexandria Renew Enterprises:	Jim Sizemore, Quality Manager Adrienne Fancher, Chief Operating Officer Rickie Everetie, Chief Plant Operator Ron Allen, Plant Superintendant Jeff Duval, Engineering Manager Joel Gregory, Process Manager Larry Cable, General Lead

City Consultant:	Clyde Wilber, Principal, Greeley and Hansen
Virginia Department of Environmental Quality:	Douglas Frasier, VPDES Permit Writer Sharon Allen, Water Compliance Inspector
EPA Representatives:	Steve Maslowski, EPA Region 3 Matthew Colip, EPA Region 3 James Zimny, Headquarters
EPA Contractor:	Danny O'Connell, PG Environmental, LLC Jake Albright, PG Environmental, LLC

II. BACKGROUND AND GENERAL DESCRIPTION OF RESPONSIBILITIES

The City of Alexandria and portions of Fairfax County discharge wastewater to the City's collection system and WRRF. About 5 percent of the City's sewer system is combined and about 95 percent is separate. The flows from Fairfax County account for approximately 55 percent of the total flow in the collection system on a daily basis (Fairfax County is permitted a maximum 60 percent share of the system). The City is approximately 15 square miles with a population of about 142,000. The population of the total service area, including the contributing municipalities, is about 350,000. Average daily flow to the WRRF is approximately 35 million gallons per day (mgd). The design flow of the WRRF is 54 mgd.

The City conducted a PowerPoint presentation (Attachment C) for the EPA Inspection Team on June 27, 2012. The presentation outlined the City's (and AlexRenew's) responsibilities for the collection system.

The City's Transportation and Environmental Services (T&ES) operates and maintains the collection system within the City except for the interceptor sewers which are owned and operated by AlexRenew. The City owns all four CSOs, but the CSOs are maintained by AlexRenew (i.e., tide gates and regulators for CSOs 001, 002, 003, and 004). AlexRenew also owns and operates the pump stations and wet weather storage vaults within the City, as well as a plant flow regulator near the CSO 002 control weir.

The Permit authorizes discharges from the WRRF and four CSO locations within the conveyance system. The CSOs are permitted to discharge to the Oronoco Bay, Hunting Creek Embayment, or Hooff's Run, which are all located in the Potomac River Basin. The Permits also include requirements and other conditions regarding the operation and maintenance of the WRRF, the industrial pretreatment program, and management and control of the CSOs. Table 2 summarizes AlexRenew's interceptor sewers.

Table 2. Summary of AlexRenew's Interceptor Sewers

Interceptor Name	Size Range (inches)	Approx. Length (miles)
Holmes Run	30-72	6.4
Commonwealth	27-72	3.2
Potomac	36-42	2.4
Potomac Yard	24-30	1.6

III. ASSESSMENT OF NINE MINIMUM CONTROLS IMPLEMENTATION

A. NMC #1 – Proper Operation and Regular Maintenance Programs for the Sewer System and the CSOs

Section E.1 of the Permit requires the permittee to "Conduct Proper Operations and Regular Maintenance Programs." Section E.1 states:

> *The permittee shall continue to implement the operation and maintenance plan for the Combined Sewer System (CSS) that includes the elements listed below. The permittee shall update the plan to incorporate any changes to the system and shall operate and maintain the system accordingly. The permittee shall maintain records to document the implementation of the plan.*

Section E.1 of the Permit further requires:

a. *Designation of a Manager for the CSS. The permittee shall designate a person to be responsible for the wastewater collection system and serve as the contact person regarding the CSS.*
b. *Inspection and Maintenance of CSS.*
    i. *The permittee shall ensure monthly inspection and maintenance of all outfalls, tide gates, diversion and regulator structures within the CSS.*
    ii. *The permittee shall inspect each CSS outfall twice a month to confirm that no dry weather overflows are occurring.*
    iii. *The permittee shall maintain records of inspections and maintenance for all aforementioned structures.*
c. *Provision for Trained Staff. The permittee shall continue to ensure the availability of trained staff to complete the operation, maintenance, repair and testing functions required to comply with the terms and conditions of this permit. Each staff member shall receive appropriate training and all training shall be documented and updated annually.*
d. *Allocation of funds for O&M. The permittee shall allocate adequate funds specifically for operation and maintenance activities. The permittee shall submit a certification of assurance with the annual report that the necessary funds, equipment and personnel have been committed to carry out the O&M plan for the next fiscal year.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "The first minimum control, proper operation and regular maintenance of the CSS and CSO outfalls, should consist of a program that clearly establishes operation, maintenance, and inspection procedures to ensure that a CSS and treatment facility will function in a way to maximize treatment of combined sewage and still comply with NPDES permit limitations."

According to EPA's guidance document, a Proper Operation and Maintenance (O&M) Program generally should include the following:

- The organization and people responsible for various aspects of the O&M program.
- Resources (i.e., people and dollars) allocated to O&M activities.
- Planning and budgeting procedures for O&M of the CSS and treatment facilities.
- List of the facilities (e.g., tide gates, overflow weirs) critical to the performance of the CSS.

- Written procedures and schedules for routine, periodic maintenance of major items of equipment and CSO diversion facilities, as well as written procedures to ensure that regular maintenance is performed.
- A process for periodic inspections of the facilities listed previously.
- Written procedures, including procurement procedures if applicable, for responding to emergency situations.
- Policies and procedures for training O&M personnel.
- A process for the periodic review and revision of the O&M program.

The EPA Inspection Team made the following observations:

During the inspection of the Royal Street Regulator for CSO 002, the EPA Inspection Team observed intrusion from the Hunting Creek Embayment into the collection system. When questioned about whether this is common, City representatives responded that intrusion is often observed during weekly inspections of the regulator. However, these observations and field variables, including times, intrusion flow rate, sewer capacity, height of freeboard on weir wall, are not being documented or recorded. Refer to Exhibits 1 and 2 for a description and photograph (refer to Photograph 4) of the asset.

1) The AlexRenew team has developed a number of operational standard operating procedures (SOPs) to support normal and regularly experienced operational conditions. Attachment D contains copies of the SOPs reviewed for this component of the inspection process. The inspection team reviewed three SOPs, *High Flow Guidance*, *Overflow Monitoring at Four-Mile Run Pump Station*, and *Hoof Run Junction Chamber*.

   The SOPs contained requirements to capture the critical information needed to describe the operational procedure. The City did not consistently document operational variables such as inspection times, flows, or document comments that described the operational status of the sewer structures being observed.

   Specific examples were observed in the entries made on September 8, 2011 at 2010 for the Four Mile Run Pump Station (FMR) and the collection system. (NOTE: AlexRenew's records and documentation use a 24-hour clock notation. To maintain consistency, that same notation is used here.) These entries contain different plant flow rates for the same time. Another example is the entry made for September 9, 2011 at 2300, which, based on flow comparisons, appears to have the wrong date.

   In addition, the operations team does not inspect or document the wet well and/or overflow weir heights during periods of peak asset demand and stress (e.g. September 7 at 1600 and 2300; September 8 at 0300, 0923, and 2010) during the September 5 – 10, 2011 wet weather event. The SOP required monitoring every 20 minutes. In addition, a number of the log entries for the FMR pump station did not contain data sets for the station pump or flow rates (e.g. September 7 at 1600 and 2300; September 8 at 0300). Without regular observations of the overflow weirs and the station's pump rates, it was not possible to know if the station was discharging or if the City was maximizing flows to the WRRF or storage within the collection system.

AlexRenew generated an internal *Incident Record and Resolution Report* (Attachment F) that stated, "the Four Mile Run pump station overflowed on three separate occasions from 7:00 am on September 8 to 4:40 am on September 9, 2011." FMR data entries made on September 8, 2011 include:

- 0300: "detention tank level 9.16."
- 0705: "detention tank discharge flow was 14 inches over weir wall detention tank level 13.15."

There was a four-hour time lapse when no inspections or observations were conducted at the FMR overflow weirs leaving the actual overflow start time unknown.

The AlexRenew team conducted its own evaluation of this event. This activity was documented in the AlexRenew Corrective Action Notice (CAN) (see Attachment G). The CAN stated that SOPs were not followed. The AlexRenew team conducted a root-cause analysis of the September wet weather event as a component of the CAN process.

Two observations were made: the AlexRenew team 1) did not monitor overflows; and 2) did not document the operational observations of variables made during the inspection or monitoring activities. The CAN identified both short- and long-term actions to ensure future compliance. The long-term actions included the revision and update of SOPs, training on the updated SOPs, and the development of log sheets to record overflows.

The CAN did not review or discuss issues associated with the overflow heights observed during the event or the heights stated as "approximate" in the SOP. The approximate height stated for the detention tank to start overflowing is 13 feet. There are multiple data entries during the event that document the detention tank level at 12.15 feet, yet there is flow over the weir from the detention tank. Based on information contained in the event report, the EPA Inspection Team estimated that there are operational conditions and variables that create overflows of the detention tank at levels well below 13 feet.

2) A review of the AlexRenew team's *High Flow Report* dated September 5–10, 2011 identified a number of "Event/Occurrence" entries on September 8, 2011 between 1820 and 2100 concerning flooding, sewer backups, and surcharging. The inspection team found no associated work orders (WOs) for these "Event/Occurrence" entries in the data provided. Two WOs for September 9, 2011 (#15555 and #15556, Attachment H) were located.

   The City responded to the WOs 3 and 11 days, respectively, after the residents' calls concerning sewer backups. Both WOs documented that the sewer main was flowing at the time of the service inspection. WO #15556 stated that "signs of a surcharge in the manhole at the corner of Donelson Street and the service road" were found.

   In some instances, the City responded to sewer backups 3 and 11 days after being informed of an unpermitted discharge. Based on the information available, the EPA Inspection Team noted that sewage backups into residences were occurring within the City and not being reported to the state or the EPA.

A search of the WOs received by the inspection team did find a WO (#17682, Attachment I) for one of the addresses documented in the *High Flow Report,* 104 East Monroe Avenue. This WO was for another backup that occurred on December 9, 2011.

It took the City seven days to respond to the WO. The "City did install a backflow preventer in the manhole at the rear of the property" to stop the surcharge from the sewer main. There was no record of any illegal sewer discharges reported for this address.

On July 14, 2011, a WO (#13788, Attachment J) was created for "raw sewage" backup "through entire court yard area/parking lot." The WO states that the line was not inspected or serviced until March 27, 2012.

B. NMC #2 – Maximum use of the Collection System for Storage

Section E.2 of the Permit requires the permitee to "Maximize Use of the Collection System for Storage." Section E.2 of the Permit states:

> *The permittee shall maximize the in-line storage capacity of the CSS. The permittee shall maintain records to document implementation.*
>
> a. *Maintain all dams or diversion structures at or exceeding their current heights (as of effective date of permit).*
> b. *Minimize discharges from the CSS outfalls by maximizing the storage capacity provided by the dams and diversion structures; allowing for later treatment at the POTW.*
> c. *Keep maintenance records for the dams or diversion structures and activities dealing with sewer blockages.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "As the second minimum control, maximum use of the collection system for storage means making relatively simple modifications to the CSS to enable the system itself to store wet weather flows until downstream sewers and treatment facilities can handle them."

EPA's guidance document provides several examples of simple control measures that can be implemented to increase the storage capacity of a CSS. These measures include the following:

- Inspecting collection system to identify deficiencies which restrict storage capacity of the system (e.g., sediment build up in sewer lines, undersized pipe).
- Maintaining and repairing tide gates to eliminate leaking.
- Adjusting regulator settings to maximize weir heights for increased storage within the sewer system.
- Retarding inflows by using special gratings or hydrobrakes in catch basins to restrict rate at which surface runoff is permitted into the system.
- Using localized upstream detention for short-term storage (e.g., upstream parking area usage for temporary water storage).
- Upgrading or adjusting pump operations at interceptor lift stations to increase pump rates if downstream sections have available hydraulic capacity.
- Removing obstructions to flows (e.g., sediment accumulation or other debris).

EPA Inspection Team noted the following observations:

1) The City and AlexRenew did not have a structured approach to evaluate the weir heights within the CSS to maximize storage of wastewater flows in the system. City representatives indicated that CSOs 003 and 004 may have been evaluated within the past 20 years.

2) The City and AlexRenew did not have any records or documentation stating the current status of additional storage available within the system.

3) City representatives stated that Fairfax County was not required to conduct inflow and infiltration (I/I) assessments or to reduce I/I. Fairfax County owns a majority share in the WRRF capacity. Below is a description of the joint use agreement between the City and Fairfax County.

   The *Amended and Restated Service Agreement* (Agreement; Attachment K) became effective on October 1, 1998. The Agreement is a joint use service arrangement that gives Fairfax County a 60 percent (maximum) share in the capacity of the WRRF as well as share in two other joint use facilities, the Commonwealth Interceptor and the Holmes Run Trunk Sewer. Conversely, the City has a 40 percent share; it can use its entire share or lease to other municipalities if desired. City representatives stated that there are flow sensors on the interceptors where the Fairfax County system discharges into the City's system. Monitoring data is used for billing purposes in addition to capacity control.

   Table 3 below describes the joint use facilities and the share owned by Fairfax County as obtained from the Agreement.

Table 3. Fairfax County Share of Joint Use Facilities

Facility	Fairfax County Share (maximum possible)
AlexRenew WRRF	32.4 mgd maximum average monthly flow (60 percent of Permit authorized design flow (54.0 mgd)) 64.8 mgd maximum daily quantity
Commonwealth Interceptor	
Hooff's Run Junction Chamber to the connection for the County's Jones Point Pumpover	57.7 mgd
Jones Point Pumpover connection to the WRRF	64.8 mgd
Holmes Run Trunk Sewer	
From the City-County boundary to the original Cameron Station connection	18.9 mgd
From the original Cameron Station connection to MH 30 on the 1976 WAMATA relocation	42.7 mgd
From MH 30 on the 1976 WAMATA relocation to MH 17 on the 1976 WAMATA relocation	67.7 mgd

From MH 17 on the 1976 WAMATA relocation to Hooff's Run Junction Chamber	57.7 mgd

4) Hooff's Run Junction Chamber was documented as being submerged during wet weather events.

   According to AlexRenew's *High Flow Report* for September 5 – 10, 2011 (Attachment E), the Hooff's Run Junction Chamber was reported as being submerged on September 8, 2011 at 2000. The top of the structure was reported to be visible again at 2300 on September 8, 2011, and the middle of the structure was reported visible at 0100 on September 9, 2011. The available documentation does not state how much stream water was flowing into the sewer system and reducing system storage capacity.

5) Intrusion into the conveyance system was observed at CSO 002 during the inspection. Refer to Section III.A.1 of this report for additional details on the intrusion at this location.

C. NMC #3 – Review and Modification of Pretreatment Requirements to Ensure CSO Impacts are Minimized

Section E.3 of the Permit requires the "Control of Non-domestic Discharges." Section E.3 of the Permit states:

> *The permittee shall continue to implement selected CSO controls to minimize the impact of non-domestic discharges. The permittee shall coordinate with the Alexandria Sanitation Authority in the control of industrial users and whether additional modifications to its pretreatment program are necessary.*

Section E.3 continues by stating that control shall contain the following:

> *Control of non-domestic users shall also include the following:*
>
> a. *Maintain records documenting this evaluation and implementation of the selected CSO controls to minimize CSO impacts resulting from non-domestic discharges.*
> b. *Requiring Significant Industrial Users (SIU) discharging to the CSS to minimize batch discharges during wet weather conditions.*
> c. *Continued control of illicit dischargers and/or improper disposal to the CSS via detection and elimination.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "Under the third minimum control, the municipality should determine whether nondomestic sources are contributing to CSO impacts and, if so, investigate ways to control them. The objective of this control is to minimize the impacts of discharges into CSSs from nondomestic sources (i.e., industrial and commercial sources, such as restaurants and gas stations) during wet weather events, and to minimize CSO occurrences by modifying inspection, reporting, and oversight procedures within the approved pretreatment program."

EPA's guidance document provides the following steps for municipalities to implement the third NMC:

- Inventory nondomestic discharges to the CSS, including the identification of discharge locations on a map of the system.
- Assess the impact of nondomestic discharges on the CSOs and receiving waters.
- Assess the value and feasibility of modifications to the existing pretreatment program's approach of regulating nondomestic users to reduce the impact on CSO discharges.

EPA Inspection Team noted the following observations:

1) The Royal Street Bus garage is upgradient of CSO 001 and the Pendleton Street Regulator. The facility has not been directed to make any changes related to reducing or eliminating process water discharges during or after wet weather events. Based on the information available during the inspection it was unclear if the facility was located within the combined or the recently separated sewer area.

AlexRenew is responsible for the IPP; however, the City owns and operates the collection system and manages the stormwater program. If this facility is in a combined sewer area the IPP team should evaluate possible operational changes (e.g. storage of concentrated wastewaters) during wet weather events to minimize impact on the CSO system.

D. NMC #4 – Maximization of Flow to the Publicly Owned Treatment Works for Treatment

Section E.4 of the Permit requires the permittee to "Maximize Flow to POTW." Section E.4 of the Permit states:

> *The permittee shall convey, to the greatest extent practicable, all wet weather flows to the POTW within the constraints of the CSS and the capacity of the POTW. The POTW is owned, operated and maintained by Alexandria Sanitation Authority and is regulated under a separate VPDES permit (VAOO25160). The permittee shall maintain records to document these actions.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "The fourth minimum control, maximizing flow to the POTW, entails simple modifications to the CSS and treatment plant to enable as much wet weather flow as possible to reach the treatment plant. The objective of this minimum control is to reduce the magnitude, frequency, and duration of CSOs that flow untreated into receiving waters."

EPA's guidance document provides the following measures for municipalities to implement the fourth NMC:

- Determine the capacity of the major interceptor(s) and pump station(s) and ensure that full capacity is available.
- Analyze records comparing flows processed at the WRRF during wet and dry weather to determine relationships between performance and flow.
- Compare current flows with the design capacity of the overall facility, as well as the capacity of individual process units to identify available excess capacity.
- Determine the ability of the facility to operate acceptably at incremental increases in wet weather flows and estimate impacts on compliance.
- Determine whether any inoperative or unused treatment facilities on the POTW site can be used to store or treat wet weather flows.

- Develop cost estimates for any planned physical modifications and any additional O&M costs at the treatment plant due to the increased wet weather flow.

EPA Inspection Team noted the following observations:

1) The Four Mile Run Pump Station had a pumping capacity of 11.4 mgd; however, its associated force main had a maximum capacity of 9.4 mgd, limiting the storage able to be provided by the collection system. The main, a 24-inch force main, conveys flow to the Commonwealth Interceptor.

   City and AlexRenew representatives stated that the Four Mile Run Pump Station is equipped with two service chambers adding approximately 1.05 million gallons of capacity to the pumping station. Upon a field inspection of these service chambers, the EPA Inspection Team found that these chambers had the potential to overflow and cause an SSO discharge into Four Mile Run during wet weather events. A more detailed explanation of these chambers can be found in Section IV.B of this report.

2) Intrusion into the conveyance system was observed at CSO 002 during the inspection.

   According to City representatives who perform routine inspections of the CSO 002 weir, intrusion is typically observed at the location, but it is not recorded in the observation log. The EPA Inspection Team recommended that the City and AlexRenew evaluate the impacts of the intrusion on the CSS and WRRF during dry and peak flows. Refer to Section III.A.1 of this report for additional details on the intrusion at this location.

3) The EPA Inspection Team evaluated AlexRenew's *High Flow Report* for September 5-10, 2011(Attachment E). The report documented a number of times when unpermitted discharges were occurring from the Four Mile Run Pump Station while the pump station was pumping less than its designed flow capacity.

   At 0705 on September 8, 2011, AlexRenew reported that the Four Mile Run detention tank was discharging 14 inches over the weir wall. The reported pump station flow at the time was 7.21 mgd. As discussed previously, the pump station's capacity is 11.4 mgd and the 24-inch force main's capacity is 9.4 mgd. The *High Flow Report* for this event indicates that the discharge lasted until approximately 1015. The Four Mile Run detention tank was also reported to be discharging at "2430" on September 9, 2011. (The correct time is believed to have been 12:30am on September 9, 2011.) The pump station had a flow of 6.94 mgd at this time. The detention tank was reported to still be discharging at 4:30am on September 9, 2011 (flow reported as 6.33 mgd). The Four Mile Run Pump Station and service chambers were reported to be unclogged at 8:30am on September 9, 2011. No further discharges were reported at this location during the September 5-10, 2011 wet weather event.

   A detailed flow schematic of the Four Mile Run Pump Station, service chambers, and detention tank can be found in Attachment L.

4) The City does not maintain records to document that they conveyed all wet weather flows to the Public Owned Treatment Works (POTW) within the constraints of the CSS and the capacity of the POTW.

E. NMC #5 – Elimination of CSOs during Dry Weather

Section E.5 of the Permit requires the permittee to "Prohibit Combined Sewer Overflows during Dry Weather." Section E.5 of the Permit states:

Dry weather overflows from CSS outfalls are prohibited. Dry weather flow conditions shall mean the flow in a combined sewer that results from sanitary sewage, industrial wastewater and infiltration/inflow; with no contribution from storm water runoff or storm water induced infiltration. Wet weather flow condition shall mean the flow in a combined sewer including storm water runoff and/or storm water induced infiltration. Documentation required during dry weather CSO events are as follows:

a. *All dry weather overflows must be reported to DEQ and the local health department within 24 hours of when the permittee becomes aware of a dry weather overflow.*
b. *Upon becoming aware of an overflow, the permittee shall begin corrective action immediately. The permittee shall monitor the dry weather overflow until the overflow has been eliminated.*
c. *The permittee shall record, in the inspection log book, an estimate of the beginning and ending times of the discharge, discharge volume and corrective measures taken.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

"The fifth minimum control, elimination of CSOs during dry weather, includes any measures taken to ensure that the CSS does not overflow during dry weather flow conditions. Since the NPDES program prohibits dry weather overflows (DWOs), the requirement for DWO elimination is enforceable independent of any programs for the control of CSOs."

EPA's guidance document states that "a visual inspection program of sufficient scope and frequency is needed to provide reasonable assurance that any occurrence will be detected." The document also provides several examples of actions to alleviate DWOs caused by operational issues. Examples of these corrective actions include adjustment of regulator settings, maintenance and repair of regulators, maintenance of tide gates, interceptor cleaning, and sewer repair.

EPA Inspection Team noted the following observations:

1) According to the City's PowerPoint presentation (Attachment C), dry weather overflows (DWOs) occurred at CSOs in the conveyance system. The City reported the occurrence of six DWOs in 2009. Table 4 below describes each event as reported by the City.

Table 4. Summary of Reported DWOs

Date	Location	Cause	Follow-up Action
5/10/09	CSO 003	Captured metering data	Increased inspection for a period. None observed.
7/17/09	CSO 003	Captured metering data	Increased inspection for a period. None observed.
8/19/09	CSO 004	During pump around for interceptor rehabilitation	Contractor instructed to lower level in manhole; discharge lasted about 15 minutes.
8/20/09	CSO 004	During pump around for interceptor rehabilitation	Pump around procedures modified and discharge stopped. Lasted about 20 minutes.
8/20/09	CSO 004	Siphon clogged	Crew cleaned the siphon and discharge lasted less than 2 hours.

Table 4. Summary of Reported DWOs			
Date	**Location**	**Cause**	**Follow-up Action**
8/28/09	CSO 004	During pump around for interceptor rehabilitation	Contractor directed to lower elevation in the wet well and discharge reduced, yet not stopped due to intense, sporadic rainfall. Not able to estimate duration of DWO.

F. NMC #6 – Control of Solid and Floatable Materials in CSOs

Section E.6 of the Permit requires "Control Solid and Floatable Materials." Section E.6 of the permit states:

The permittee shall implement measures to control solid and floatable materials in the CSS. Such measures shall include:

a. *Regular catch basin and street cleaning within the CSS sewershed.*
b. *Cleaning of the trunk lines and structures to prevent accumulation of solids.*
c. *Consideration of entrapment and baffling devices to reduce discharges of solids and floatable materials.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "The sixth minimum control is intended to reduce, if not eliminate, visible floatables and solids using relatively simple measures. Simple devices including baffles, screens, and racks can be used to remove coarse solids and floatables from combined sewage, and devices such as booms and skimmer vessels can help remove floatables from the surface of the receiving water body."

EPA's guidance document provides schematics and a more thorough description of possible modifications and devices that can be used to control and remove solids and floatables from combined sewage.

G. NMC #7 – Pollution Prevention

Section E.7 of the Permit requires the permitee to "Develop and Implement Pollution Prevention Program." Section E.7 of the Permit states:

The permittee shall continue to implement the pollution prevention (P2) program to reduce the impact of CSOs on receiving waters. The permittee shall maintain records to document the pollution prevention implementation activities. Specific P2 measures include:

a. *Street sweeping and catch basin cleaning at an appropriate frequency to prevent large accumulations of pollutants and debris.*
b. *A public education program that informs the public of the City's household hazard waste recycling program.*
c. *A waste oil and antifreeze recycling/referral service program.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

"The seventh minimum control, pollution prevention, is intended to keep contaminants from entering the CSS and thus receiving waters via CSOs[...]The objective of this minimum control is to reduce to the greatest extent possible the amount of contaminants that enter the CSS."

EPA's guidance document provides information regarding measures such as street cleaning, public education, solid waste collection, product ban/substitution, hazardous waste collection, and recycling as actions which can be taken to prevent contaminants from entering the CSS.

H. NMC #8 – Public Notification to Ensure that the Public Receives Adequate Notification of CSO Occurrences and CSO Impacts

Section E.8of the Permit requires the permitee to provide "Public Notification." Section E.8 of the Permit states:

The permiittee shall continue to implement a public notification plan to inform citizens of when and where CSOs occur.

Section E.8 of the Permit further states that the process must include:

a. A notice to alert persons using all affected receiving water bodies. The permittee shall ensure that identification signs at all CSS outfalls are maintained and easily readable by the public.
b. The permittee shall maintain records documenting public notification.

As stated in EPA's *Guidance for Nine Minimum Controls:*

"The intent of the eighth minimum control, public notification, is to inform the public of the location of CSO outfalls, the actual occurrences of CSOs, the possible health and environmental effects of CSOs, and the recreational or commercial activities (e.g., swimming and shellfish harvesting) curtailed as a result of CSOs."

EPA's guidance document provides the following measures for notifying the public about CSO events:

- Posting at affected use areas.
- Posting at selected public places.
- Posting at CSO outfalls.
- Notices in newspapers or on radio and TV news programs.
- Letter notification to affected residents.
- Telephone hot line for interested citizen calls.

EPA Inspection Team noted the following observations:

1) The EPA Inspection Team observed two unpermitted overflow locations that also did not have signage. The unpermitted overflow locations were observed at Hooff's Run and Four Mile Run. City representatives stated that these locations did not have signage. Observations made by the EPA Inspection Team during visits to both locations on June 26, 2012 confirmed that signage informing the public of a discharge location was not present.

I. NMC #9 – Monitoring to Effectively Characterize CSO Impacts and the Efficacy of CSO Controls

Section E.9 of the Permit requires the permittee to conduct a "Long-Term Control Plan Review." Section E.9 of the Permit states:

> *The permittee shall review the Long-Term Control Plan (LTCP) annually for compliance with water quality standards, minimization of overflows and impacts from overflows. Any changes shall be submitted to the Department of Environmental Quality Northern Regional Office.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "The ninth minimum control involves visual inspections and other simple methods to determine the occurrence and apparent impacts of CSOs. This minimum control is an initial characterization of the CSS to collect and document information on overflow occurrences and known water quality problems and incidents, such as beach or shellfish bed closures, that reflect use impairments caused by CSOs."

EPA's guidance document states that a municipality should characterize its system (obtain maps of CSS, locations of CSO outfalls, etc.), record the occurrence of overflows (via visual inspection, inspection aids, or automatic measurement), and record and summarize information on water quality or usage of the CSO receiving waters.

IV. ADDITIONAL FINDINGS

A. Hooff's Run Junction Chamber

The EPA Inspection Team conducted a site visit at the Hoooff's Run Junction Chamber on June 26, 2012. During an inspection of the structure, it was found that the chamber had the potential to discharge during a high flow event; however, the structure is not a permitted CSO under VPDES Permit No. VA0087068.

The structure is designed to receive flow from the Commonwealth Interceptor and the Holmes Run Trunk Sewer and direct it to the WRRF. The Commonwealth Interceptor is reported to be a combined sewer asset, while the Holmes Run Trunk Sewer is a sanitary sewer asset. The EPA Inspection Team found that the structure had engineered overflow gates near the top of the chamber which would allow an overflow directly into Hooff's Run during a significant high flow event. Photographs 2 and 3 illustrate the position of the overflow gates in the Hooff's Run Junction Chamber. City representatives stated that they were aware of the structure's potential to discharge into Hooff's Run. This junction chamber functions as both an unpermitted CSO and a constructed SSO. Refer to Exhibits 1 and 2 of this report for a description of and photographs from the site visit.

B. Four Mile Run Service Chambers

The EPA Inspection Team conducted a site visit at the Four Mile Run Pump Station and Service Chambers on June 26, 2012. During an inspection of the structures, the EPA Inspection Team found that the chambers had the potential to discharge during high flow events. The Four Mile Run Pump Station and Service Chambers are located on the north end of the Commonwealth Interceptor.

The chambers are designed to provide added storage capacity for the Four Mile Run Pump Station. As stated above, the pumping capacity for the station is 11.4 mgd while the capacity of the 24-inch force main is only 9.4 mgd. The service chambers are able to store an added 1.05 million gallons in a high flow event. If a high flow event exceeds the capacity of the force main and the storage chambers, sanitary sewer flow has the potential to overflow the service chamber into Four Mile Run. Refer to Section III.D.3

of this report for details on a past unpermitted discharge event. A schematic of the Four Mile Run Pump Station and Service Chambers can be found in Attachment L. Also, refer to Exhibits 1 and 2 of this report for a description of and photographs from the site visit.

ATTACHMENT 8

Planning Statement

To:	Jennifer Carlson
From:	Douglas Frasier
Date:	14 February 2014
Subject:	Planning Statement for AlexRenew Enterprises Water Resources Recovery Facility
Permit Number:	VA0025160

Information for Outfall 001:

Discharge Type:	major municipal
Discharge Flow:	54 MGD
Receiving Stream:	Hunting Creek – Outfall 001
Latitude / Longitude:	38° 47' 37" / 77° 03' 26"
Rivermile:	0.57
Streamcode:	1aHUT
Waterbody:	VAN-A13E
Water Quality Standards:	Class II, Section 6, sp stds. b,y
Drainage Area:	44.8 square miles

Information for Outfall 002 (Emergency Use Only)**:**

Discharge Type:	major municipal
Discharge Flow:	54 MGD
Receiving Stream:	Hooff Run – Outfall 002
Latitude / Longitude:	38° 47' 49" / 77° 03' 36"
Rivermile:	0.15
Streamcode:	1aHFF
Waterbody:	VAN-A13E
Water Quality Standards:	Class II, Section 6, sp stds. b,y
Drainage Area:	1.3 square miles

1. Please provide water quality monitoring information for the receiving stream segment. If there is not monitoring information for the receiving stream segment, please provide information on the nearest downstream monitoring station, including how far downstream the monitoring station is from the outfall.

<u>Outfall 001</u>

Outfall 001 discharges into tidal Hunting Creek. The closest DEQ monitoring station is 1aHUT000.01, located at the G.W. Parkway bridge crossing, approximately 0.4 miles downstream of Outfall 001. The following is the summary for the tidal portion of Hunting Creek, as taken from the 2012 Integrated Report:

Class II, Section 6, special stds. b, y.

DEQ monitoring stations located in tidal Hunting Run:

- *Ambient water quality and fish tissue monitoring station 1aHUT000.01, at the George Washington Parkway;*
- *Ambient monitoring station 1aHUT001.54, 300 yards downstream from Telegraph Road*
- *Ambient monitoring station 1aHUT001.72, at Route 611/241 (Telegraph Road)*
- *Ambient monitoring station NHUT01 at Belle Haven Marina Dock.*

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and PCB fish tissue monitoring. Additionally, SPMD data (at station 1aHUT001.54) and water quality data (at station 1aHUT001.72) each revealed exceedances of the human health criteria of 0.64 parts per billion (ppb) PCBs. A PCB TMDL for the tidal Potomac River watershed has been completed and approved. Observed effects are noted for the following: an excursion above the tissue value (TV) of 300 parts per billion (ppb) for mercury (Hg) in fish tissue was recorded in tissue from one specie (largemouth bass) of fish sampled in 2008 at monitoring station 1aHUT000.01; excursions above the tissue value (TV) of 110 parts per billion (ppb) for total chlordane in fish tissue were recorded in tissue from one specie (carp) of fish sampled (2 excursions) in 2008 at monitoring station 1aHUT000.01; excursions above the tissue value (TV) of 4.4 parts per billion (ppb) for heptachlor epoxide in fish tissue were recorded in tissue from one specie (carp) of fish sampled (2 excursions) in 2008 at monitoring station 1aHUT000.01.

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for the Hunting Creek watershed has been completed and approved.

The wildlife use is considered fully supporting.

The aquatic life use is fully supporting in tidal Hunting Creek. A TMDL has been completed for the Chesapeake Bay watershed. This downstream TMDL completed by EPA addresses the poor water quality in the Chesapeake Bay, and takes into account the entire Bay watershed including upstream tidal tributaries such as Hunting Creek. The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed. An observed effect is noted for the aquatic life use due to an exceedance of the chlordane ER-M sediment screening criteria of 6 ppb (dry weight) for a sediment sample collected in 2000.

Outfall 002

Outfall 002 discharges into tidal Hooff Run. The closest DEQ monitoring station is located downstream of Outfall 002, in tidal Hunting Creek. Station 1aHUT000.01 is located at the G.W. Parkway bridge crossing, approximately 0.78 miles downstream of Outfall 002. Although there is not a DEQ monitoring station in Hooff Run, the segment has been assessed. The following is the summary for the tidal portion of Hooff Run, as taken from the 2012 Integrated Report:

Class II, Section 6, special stds. b, y.

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory.

The aquatic life use is fully supporting. A TMDL has been completed for the Chesapeake Bay watershed. This downstream TMDL completed by EPA addresses the poor water quality in the Chesapeake Bay, and takes into account the entire Bay watershed including upstream tidal tributaries such as Hooff Run. The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed.

The recreation and wildlife uses were not assessed.

2. Does this facility discharge to a stream segment on the 303(d) list? If yes, please fill out Table A.

Yes, both Outfall 001 and 002 discharge to a waterbody on the 303(d) list.

Table A. 303(d) Impairment and TMDL information for the receiving stream segment

Waterbody Name	Impaired Use	Cause	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Impairment Information in the 2012 Integrated Report						
Outfall 001						
Hunting Creek	Recreation	*E. coli*	Hunting Creek Watershed Bacteria 11/10/2010	9.40E+13 cfu/year *E. coli*	126 cfu/100ml *E. coli* --- 54 MGD	N/A
	Fish Consumption	PCBs	Tidal Potomac River PCB 10/31/2007	4.77 grams/year PCB	0.064 ng/L PCB --- 54 MGD	N/A
Outfall 002						
Hooff Run	Fish Consumption	PCBs	Tidal Potomac River PCB 10/31/2007	WLA assigned to facility, for Outfall 001. As noted above the WLA is 4.77 grams/year of PCBs.		N/A

3. Are there any downstream 303(d) listed impairments that are relevant to this discharge? If yes, please fill out Table B.

Yes.

Table B. Information on Downstream 303(d) Impairments and TMDLs

Waterbody Name	Impaired Use	Cause	Distance From Outfall	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Information in the Chesapeake Bay TMDL							
Chesapeake Bay	Aquatic Life	Total Nitrogen	---	Chesapeake Bay TMDL 12/29/2010	500,690 lbs/yr TN	Edge of Stream (EOS) Loads	N/A
		Total Phosphorus			29,932 lbs/yr TP		
		Total Suspended Solids			4,988,627 lbs/yr TSS		

Part C of the Water Quality Management Planning Regulation for the Potomac-Shenandoah River Basin (9VAC25-720-50) contains the nitrogen and phosphorus wasteload allocations for significant dischargers in the Chesapeake Bay watershed. In this section, permit number VA0025160 has wasteload allocations of 493,381 lbs/year of total nitrogen and 29,603 lbs/year of total phosphorus.

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?

   The tidal Potomac River is listed with a PCB impairment and a TMDL has been developed to address this impairment. This facility has been included in the Tidal Potomac River PCB TMDL and has received a WLA. This facility conducted PCB monitoring during the last permit cycle in support of the PCB TMDL. The PCB monitoring data will be evaluated, and source reductions through pollution minimization plans may be needed.

5. Fact Sheet Requirements – Please provide information regarding any drinking water intakes located within a 5 mile radius of the discharge point.

   There are no public water supply intakes located within 5 miles of this discharge.

ATTACHMENT 9

Water Quality Criteria / Wasteload Allocation Analyses

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Alexandria Renew Enterprises Permit No.: VA0025160

Receiving Stream: Hunting Creek Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	101.2	mg/L	1Q10 (Annual) =	59	MGD	Annual - 1Q10 Mix =	1.96	%	Mean Hardness (as CaCO3) =	119	mg/L
90% Temperature (Annual) =		deg C	7Q10 (Annual) =	59	MGD	- 7Q10 Mix =	94.88	%	90% Temp (Annual) =		deg C
90% Temperature (Wet season) =	14.5	deg C	30Q10 (Annual) =	59	MGD	- 30Q10 Mix =	94.88	%	90% Temp (Wet season) =	15	deg C
90% Maximum pH =	7.6	SU	1Q10 (Wet season) =	65	MGD	Wet Season - 1Q10 Mix =	2.01	%	90% Maximum pH =	7.2	SU
10% Maximum pH =	6.9	SU	30Q10 (Wet season)	65	MGD	- 30Q10 Mix =	97.57	%	10% Maximum pH =	6.4	SU
Tier Designation (1 or 2) =	1		30Q5 =	59	MGD				Discharge Flow =	54	MGD
Public Water Supply (PWS) Y/N? =	n		Harmonic Mean =	59	MGD						
Trout Present Y/N? =	n										
Early Life Stages Present Y/N? =	y										

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	--	--	na	2.1E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	5.2E+00	--	--	--	--	--	--	--	--	--	--	na	5.2E+00
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	3.1E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	3.1E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	2.94E+01	4.88E+00	na	--	3.00E+01	9.94E+00	na	--	--	--	--	--	--	--	--	--	3.00E+01	9.94E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	2.93E+01	4.77E+00	na	--	3.00E+01	1.04E+01	na	--	--	--	--	--	--	--	--	--	3.00E+01	1.04E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.4E+04	--	--	--	--	--	--	--	--	--	--	na	8.4E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	3.5E+02	3.1E+02	na	--	--	--	--	--	--	--	--	--	3.5E+02	3.1E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	--	--	na	1.1E+03
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	4.2E-03	--	--	--	--	--	--	--	--	--	--	na	4.2E-03
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.4E+05	--	--	--	--	--	--	--	--	--	--	na	1.4E+05
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	4.6E+01	--	--	--	--	--	--	--	--	--	--	na	4.6E+01
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	2.9E+03	--	--	--	--	--	--	--	--	--	--	na	2.9E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03
Cadmium	0	4.8E+00	1.2E+00	na	--	4.9E+00	2.5E+00	na	--	--	--	--	--	--	--	--	--	4.9E+00	2.5E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	3.3E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.5E+00	8.8E-03	na	1.7E-02	--	--	--	--	--	--	--	--	2.5E+00	8.8E-03	na	1.7E-02
Chloride	0	8.6E+05	2.3E+05	na	--	8.8E+05	4.7E+05	na	--	--	--	--	--	--	--	--	--	8.8E+05	4.7E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	--	--	na	3.3E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	2.7E+02	--	--	--	--	--	--	--	--	--	--	na	2.7E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.3E+04	--	--	--	--	--	--	--	--	--	--	na	2.3E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	--	--	na	3.3E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.1E+02	--	--	--	--	--	--	--	--	--	--	na	3.1E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.5E-02	8.4E-02	na	--	--	--	--	--	--	--	--	--	8.5E-02	8.4E-02	na	--
Chromium III	0	6.6E+02	8.0E+01	na	--	6.7E+02	1.6E+02	na	--	--	--	--	--	--	--	--	--	6.7E+02	1.6E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene[C]	0	--	--	na	1.8E-02	--	--	na	3.8E-02	--	--	--	--	--	--	--	--	--	--	na	3.8E-02
Copper	0	1.6E+01	9.7E+00	na	--	1.6E+01	2.0E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	2.0E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	1.1E+01	na	3.3E+04	--	--	--	--	--	--	--	--	2.2E+01	1.1E+01	na	3.3E+04
DDD[C]	0	--	--	na	3.1E-03	--	--	na	6.5E-03	--	--	--	--	--	--	--	--	--	--	na	6.5E-03
DDE[C]	0	--	--	na	2.2E-03	--	--	na	4.6E-03	--	--	--	--	--	--	--	--	--	--	na	4.6E-03
DDT[C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	2.0E-03	na	4.6E-03	--	--	--	--	--	--	--	--	1.1E+00	2.0E-03	na	4.6E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	3.5E-01	na	--	--	--	--	--	--	--	--	--	1.7E-01	3.5E-01	na	--
Dibenz(a,h)anthracene[C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.7E+03	--	--	--	--	--	--	--	--	--	--	na	2.7E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	4.0E+02	--	--	--	--	--	--	--	--	--	--	na	4.0E+02
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	5.9E-01	--	--	--	--	--	--	--	--	--	--	na	5.9E-01
Dichlorobromomethane[C]	0	--	--	na	1.7E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
1,2-Dichloroethane[C]	0	--	--	na	3.7E+02	--	--	na	7.7E+02	--	--	--	--	--	--	--	--	--	--	na	7.7E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	na	1.5E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	6.1E+02	--	--	--	--	--	--	--	--	--	--	na	6.1E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	3.1E+02	--	--	--	--	--	--	--	--	--	--	na	3.1E+02
1,3-Dichloropropene[C]	0	--	--	na	2.1E+02	--	--	na	4.4E+02	--	--	--	--	--	--	--	--	--	--	na	4.4E+02
Dieldrin[C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.5E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	2.5E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	9.2E+04	--	--	--	--	--	--	--	--	--	--	na	9.2E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.8E+03	--	--	--	--	--	--	--	--	--	--	na	1.8E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.3E+06	--	--	--	--	--	--	--	--	--	--	na	2.3E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.4E+03	--	--	--	--	--	--	--	--	--	--	na	9.4E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.9E+02	--	--	--	--	--	--	--	--	--	--	na	5.9E+02
2,4-Dinitrotoluene[C]	0	--	--	na	3.4E+01	--	--	na	7.1E+01	--	--	--	--	--	--	--	--	--	--	na	7.1E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.1E-07	--	--	--	--	--	--	--	--	--	--	na	1.1E-07
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	4.2E+00	--	--	--	--	--	--	--	--	--	--	na	4.2E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	1.1E-01	na	1.9E+02	--	--	--	--	--	--	--	--	2.2E-01	1.1E-01	na	1.9E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	1.1E-01	na	1.9E+02	--	--	--	--	--	--	--	--	2.2E-01	1.1E-01	na	1.9E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	2.2E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	--	--	na	1.9E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.8E-02	7.3E-02	na	1.3E-01	--	--	--	--	--	--	--	--	8.8E-02	7.3E-02	na	1.3E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.3E-01	--	--	--	--	--	--	--	--	--	--	na	6.3E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.4E+03	--	--	--	--	--	--	--	--	--	--	na	4.4E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.9E+02	--	--	--	--	--	--	--	--	--	--	na	2.9E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	5.3E-01	7.7E-03	na	1.7E-03	--	--	--	--	--	--	--	--	5.3E-01	7.7E-03	na	1.7E-03
Heptachlor Epoxide [C]	0	5.2E-01	3.8E-03	na	3.9E-04	5.3E-01	7.7E-03	na	8.2E-04	--	--	--	--	--	--	--	--	5.3E-01	7.7E-03	na	8.2E-04
Hexachlorobenzene [C]	0	--	--	na	2.9E-03	--	--	na	6.1E-03	--	--	--	--	--	--	--	--	--	--	na	6.1E-03
Hexachlorobutadiene [C]	0	--	--	na	1.8E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	na	4.9E-02	--	--	na	1.0E-01	--	--	--	--	--	--	--	--	--	--	na	1.0E-01
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	na	1.7E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	9.5E-01	na	na	1.8E+00	9.7E-01	--	na	3.8E+00	--	--	--	--	--	--	--	--	9.7E-01	--	na	3.8E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.3E+03	--	--	--	--	--	--	--	--	--	--	na	2.3E+03
Hexachloroethane [C]	0	--	--	na	3.3E+01	--	--	na	6.9E+01	--	--	--	--	--	--	--	--	--	--	na	6.9E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.1E+00	na	--	--	--	--	--	--	--	--	--	--	4.1E+00	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone [C]	0	--	--	na	9.6E+03	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	1.5E+02	1.5E+01	na	--	1.5E+02	3.1E+01	na	--	--	--	--	--	--	--	--	--	1.5E+02	3.1E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+00	1.6E+00	--	--	--	--	--	--	--	--	--	--	1.4E+00	1.6E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.1E+03	--	--	--	--	--	--	--	--	--	--	na	3.1E+03
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.1E-02	na	--	--	--	--	--	--	--	--	--	--	6.1E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	2.1E+02	2.2E+01	na	4.6E+03	2.2E+02	4.5E+01	na	9.6E+03	--	--	--	--	--	--	--	--	2.2E+02	4.5E+01	na	9.6E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine [C]	0	--	--	na	3.0E+01	--	--	na	6.3E+01	--	--	--	--	--	--	--	--	--	--	na	6.3E+01
N-Nitrosodiphenylamine [C]	0	--	--	na	6.0E+01	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	1.3E+02
N-Nitrosodi-n-propylamine [C]	0	--	--	na	5.1E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.9E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	2.9E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.6E-02	2.6E-02	na	--	--	--	--	--	--	--	--	--	6.6E-02	2.6E-02	na	--
PCB Total [C]	0	--	1.4E-02	na	6.4E-04	--	2.9E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.9E-02	na	1.3E-03
Pentachlorophenol [C]	0	4.8E+00	4.4E+00	na	3.0E+01	4.9E+00	9.0E+00	na	6.3E+01	--	--	--	--	--	--	--	--	4.9E+00	9.0E+00	na	6.3E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.8E+06	--	--	--	--	--	--	--	--	--	--	na	1.8E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.4E+03	--	--	--	--	--	--	--	--	--	--	na	8.4E+03
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.4E+00	--	--	--	--	--	--	--	--	--	--	na	8.4E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	1.0E+01	na	8.8E+03	--	--	--	--	--	--	--	--	**2.0E+01**	**1.0E+01**	**na**	**8.8E+03**
Silver	0	4.6E+00	--	na	--	4.7E+00	--	na	--	--	--	--	--	--	--	--	--	**4.7E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	8.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.4E+01**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	6.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.9E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	9.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.8E-01**
Toluene	0	--	--	na	6.0E+03	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	7.5E-01	4.1E-04	na	5.9E-03	--	--	--	--	--	--	--	--	**7.5E-01**	**4.1E-04**	**na**	**5.9E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.7E-01	1.5E-01	na	--	--	--	--	--	--	--	--	--	**4.7E-01**	**1.5E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	3.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+02**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	6.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.3E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	5.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.0E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	5.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.0E+01**
Zinc	0	1.4E+02	1.3E+02	na	2.6E+04	1.4E+02	2.6E+02	na	5.4E+04	--	--	--	--	--	--	--	--	**1.4E+02**	**2.6E+02**	**na**	**5.4E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.4E+02
Barium	na
Cadmium	1.5E+00
Chromium III	9.8E+01
Chromium VI	6.5E+00
Copper	6.4E+00
Iron	na
Lead	1.9E+01
Manganese	na
Mercury	5.7E-01
Nickel	2.7E+01
Selenium	6.1E+00
Silver	1.9E+00
Zinc	5.5E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Alexandria Renew Enterprises Permit No.: VA0025160

Receiving Stream: Hunting Creek Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	101.2	mg/L	1Q10 (Annual) =	59	MGD	Annual - 1Q10 Mix =	1.96	%	Mean Hardness (as CaCO3) =	119	mg/L
90% Temperature (Annual) =	26.6	deg C	7Q10 (Annual) =	59	MGD	- 7Q10 Mix =	94.88	%	90% Temp (Annual) =	25	deg C
90% Temperature (Wet season) =		deg C	30Q10 (Annual) =	59	MGD	- 30Q10 Mix =	94.88	%	90% Temp (Wet season) =		deg C
90% Maximum pH =	7.6	SU	1Q10 (Wet season) =	65	MGD	Wet Season - 1Q10 Mix =	2.01	%	90% Maximum pH =	7.2	SU
10% Maximum pH =	6.9	SU	30Q10 (Wet season)	65	MGD	- 30Q10 Mix =	97.57	%	10% Maximum pH =	6.4	SU
Tier Designation (1 or 2) =	1		30Q5 =	59	MGD				Discharge Flow =	54	MGD
Public Water Supply (PWS) Y/N? =	n		Harmonic Mean =	59	MGD						
Trout Present Y/N? =	n										
Early Life Stages Present Y/N? =	y										

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	--	--	na	2.1E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	5.2E+00	--	--	--	--	--	--	--	--	--	--	na	5.2E+00
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	3.1E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	3.1E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	2.94E+01	2.36E+00	na	--	3.00E+01	4.80E+00	na	--	--	--	--	--	--	--	--	--	3.00E+01	4.80E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	2.93E+01	4.84E+00	na	--	3.00E+01	1.05E+01	na	--	--	--	--	--	--	--	--	--	3.00E+01	1.05E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.4E+04	--	--	--	--	--	--	--	--	--	--	na	8.4E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	3.5E+02	3.1E+02	na	--	--	--	--	--	--	--	--	--	3.5E+02	3.1E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	--	--	na	1.1E+03
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	4.2E-03	--	--	--	--	--	--	--	--	--	--	na	4.2E-03
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.4E+05	--	--	--	--	--	--	--	--	--	--	na	1.4E+05
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	4.6E+01	--	--	--	--	--	--	--	--	--	--	na	4.6E+01
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	2.9E+03	--	--	--	--	--	--	--	--	--	--	na	2.9E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03
Cadmium	0	4.8E+00	1.2E+00	na	--	4.9E+00	2.5E+00	na	--	--	--	--	--	--	--	--	--	4.9E+00	2.5E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	3.3E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.5E+00	8.8E-03	na	1.7E-02	--	--	--	--	--	--	--	--	2.5E+00	8.8E-03	na	1.7E-02
Chloride	0	8.6E+05	2.3E+05	na	--	8.8E+05	4.7E+05	na	--	--	--	--	--	--	--	--	--	8.8E+05	4.7E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	--	--	na	3.3E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	2.7E+02	--	--	--	--	--	--	--	--	--	--	na	2.7E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.3E+04	--	--	--	--	--	--	--	--	--	--	na	2.3E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	--	--	na	3.3E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.1E+02	--	--	--	--	--	--	--	--	--	--	na	3.1E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.5E-02	8.4E-02	na	--	--	--	--	--	--	--	--	--	8.5E-02	8.4E-02	na	--
Chromium III	0	6.6E+02	8.0E+01	na	--	6.7E+02	1.6E+02	na	--	--	--	--	--	--	--	--	--	6.7E+02	1.6E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	3.8E-02	--	--	--	--	--	--	--	--	--	--	na	3.8E-02
Copper	0	1.6E+01	9.7E+00	na	--	1.6E+01	2.0E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	2.0E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	1.1E+01	na	3.3E+04	--	--	--	--	--	--	--	--	2.2E+01	1.1E+01	na	3.3E+04
DDD [C]	0	--	--	na	3.1E-03	--	--	na	6.5E-03	--	--	--	--	--	--	--	--	--	--	na	6.5E-03
DDE [C]	0	--	--	na	2.2E-03	--	--	na	4.6E-03	--	--	--	--	--	--	--	--	--	--	na	4.6E-03
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	2.0E-03	na	4.6E-03	--	--	--	--	--	--	--	--	1.1E+00	2.0E-03	na	4.6E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	3.5E-01	na	--	--	--	--	--	--	--	--	--	1.7E-01	3.5E-01	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.7E+03	--	--	--	--	--	--	--	--	--	--	na	2.7E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	4.0E+02	--	--	--	--	--	--	--	--	--	--	na	4.0E+02
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	5.9E-01	--	--	--	--	--	--	--	--	--	--	na	5.9E-01
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	7.7E+02	--	--	--	--	--	--	--	--	--	--	na	7.7E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	na	1.5E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	6.1E+02	--	--	--	--	--	--	--	--	--	--	na	6.1E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	3.1E+02	--	--	--	--	--	--	--	--	--	--	na	3.1E+02
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	4.4E+02	--	--	--	--	--	--	--	--	--	--	na	4.4E+02
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.5E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	2.5E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	9.2E+04	--	--	--	--	--	--	--	--	--	--	na	9.2E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.8E+03	--	--	--	--	--	--	--	--	--	--	na	1.8E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.3E+06	--	--	--	--	--	--	--	--	--	--	na	2.3E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.4E+03	--	--	--	--	--	--	--	--	--	--	na	9.4E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.9E+02	--	--	--	--	--	--	--	--	--	--	na	5.9E+02
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	7.1E+01	--	--	--	--	--	--	--	--	--	--	na	7.1E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.1E-07	--	--	--	--	--	--	--	--	--	--	na	1.1E-07
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	4.2E+00	--	--	--	--	--	--	--	--	--	--	na	4.2E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	1.1E-01	na	1.9E+02	--	--	--	--	--	--	--	--	2.2E-01	1.1E-01	na	1.9E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	1.1E-01	na	1.9E+02	--	--	--	--	--	--	--	--	2.2E-01	1.1E-01	na	1.9E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	2.2E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	--	--	na	1.9E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.8E-02	7.3E-02	na	1.3E-01	--	--	--	--	--	--	--	--	8.8E-02	7.3E-02	na	1.3E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.3E-01	--	--	--	--	--	--	--	--	--	--	na	6.3E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.4E+03	--	--	--	--	--	--	--	--	--	--	na	4.4E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.9E+02	--	--	--	--	--	--	--	--	--	--	na	2.9E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	5.3E-01	7.7E-03	na	1.7E-03	--	--	--	--	--	--	--	--	5.3E-01	7.7E-03	na	1.7E-03
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	5.3E-01	7.7E-03	na	8.2E-04	--	--	--	--	--	--	--	--	5.3E-01	7.7E-03	na	8.2E-04
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	6.1E-03	--	--	--	--	--	--	--	--	--	--	na	6.1E-03
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	1.0E-01	--	--	--	--	--	--	--	--	--	--	na	1.0E-01
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	9.7E-01	--	na	3.8E+00	--	--	--	--	--	--	--	--	9.7E-01	--	na	3.8E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.3E+03	--	--	--	--	--	--	--	--	--	--	na	2.3E+03
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	6.9E+01	--	--	--	--	--	--	--	--	--	--	na	6.9E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.1E+00	na	--	--	--	--	--	--	--	--	--	--	4.1E+00	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	1.5E+02	1.5E+01	na	--	1.5E+02	3.1E+01	na	--	--	--	--	--	--	--	--	--	1.5E+02	3.1E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+00	1.6E+00	--	--	--	--	--	--	--	--	--	--	1.4E+00	1.6E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.1E+03	--	--	--	--	--	--	--	--	--	--	na	3.1E+03
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.1E-02	na	--	--	--	--	--	--	--	--	--	--	6.1E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	2.1E+02	2.2E+01	na	4.6E+03	2.2E+02	4.5E+01	na	9.6E+03	--	--	--	--	--	--	--	--	2.2E+02	4.5E+01	na	9.6E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	6.3E+01	--	--	--	--	--	--	--	--	--	--	na	6.3E+01
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	1.3E+02
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.9E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	2.9E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.6E-02	2.6E-02	na	--	--	--	--	--	--	--	--	--	6.6E-02	2.6E-02	na	--
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	2.9E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.9E-02	na	1.3E-03
Pentachlorophenol [C]	0	4.8E+00	4.4E+00	na	3.0E+01	4.9E+00	9.0E+00	na	6.3E+01	--	--	--	--	--	--	--	--	4.9E+00	9.0E+00	na	6.3E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.8E+06	--	--	--	--	--	--	--	--	--	--	na	1.8E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.4E+03	--	--	--	--	--	--	--	--	--	--	na	8.4E+03
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.4E+00	--	--	--	--	--	--	--	--	--	--	na	8.4E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	1.0E+01	na	8.8E+03	--	--	--	--	--	--	--	--	**2.0E+01**	**1.0E+01**	**na**	**8.8E+03**
Silver	0	4.6E+00	--	na	--	4.7E+00	--	na	--	--	--	--	--	--	--	--	--	**4.7E+00**	--	**na**	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	8.4E+01	--	--	--	--	--	--	--	--	--	--	**na**	**8.4E+01**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	6.9E+01	--	--	--	--	--	--	--	--	--	--	**na**	**6.9E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	9.8E-01	--	--	--	--	--	--	--	--	--	--	**na**	**9.8E-01**
Toluene	0	--	--	na	6.0E+03	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	**na**	**1.3E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	7.5E-01	4.1E-04	na	5.9E-03	--	--	--	--	--	--	--	--	**7.5E-01**	**4.1E-04**	**na**	**5.9E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.7E-01	1.5E-01	na	--	--	--	--	--	--	--	--	--	**4.7E-01**	**1.5E-01**	**na**	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	**na**	**1.5E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	3.3E+02	--	--	--	--	--	--	--	--	--	--	**na**	**3.3E+02**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	6.3E+02	--	--	--	--	--	--	--	--	--	--	**na**	**6.3E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	5.0E+01	--	--	--	--	--	--	--	--	--	--	**na**	**5.0E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	5.0E+01	--	--	--	--	--	--	--	--	--	--	**na**	**5.0E+01**
Zinc	0	1.4E+02	1.3E+02	na	2.6E+04	1.4E+02	2.6E+02	na	5.4E+04	--	--	--	--	--	--	--	--	**1.4E+02**	**2.6E+02**	**na**	**5.4E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.4E+02
Barium	na
Cadmium	1.5E+00
Chromium III	9.8E+01
Chromium VI	6.5E+00
Copper	6.4E+00
Iron	na
Lead	1.9E+01
Manganese	na
Mercury	5.7E-01
Nickel	2.7E+01
Selenium	6.1E+00
Silver	1.9E+00
Zinc	5.5E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Alexandria Renew Enterprises Permit No.: VA0025160

Receiving Stream: Hunting Creek Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	101.2	mg/L
90% Temperature (Annual) =		deg C
90% Temperature (Wet season) =	14.5	deg C
90% Maximum pH =	7.6	SU
10% Maximum pH =	6.9	SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	n	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	n	

Stream Flows

1Q10 (Annual) =	59	MGD
7Q10 (Annual) =	59	MGD
30Q10 (Annual) =	59	MGD
1Q10 (Wet season) =	65	MGD
30Q10 (Wet season)	65	MGD
30Q5 =	59	MGD
Harmonic Mean =	59	MGD

Mixing Information

Annual - 1Q10 Mix =	1.96	%
- 7Q10 Mix =	94.88	%
- 30Q10 Mix =	94.88	%
Wet Season - 1Q10 Mix =	2.01	%
- 30Q10 Mix =	97.57	%

Effluent Information

Mean Hardness (as CaCO3) =	119	mg/L
90% Temp (Annual) =		deg C
90% Temp (Wet season) =	15	deg C
90% Maximum pH =	7.2	SU
10% Maximum pH =	6.4	SU
Discharge Flow =	54	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	--	--	na	2.1E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	5.2E+00	--	--	--	--	--	--	--	--	--	--	na	5.2E+00
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	3.1E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	3.1E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	2.94E+01	7.92E+00	na	--	3.00E+01	1.61E+01	na	--	--	--	--	--	--	--	--	--	3.00E+01	1.61E+01	na	--
Ammonia-N (mg/l) (High Flow)	0	2.93E+01	4.77E+00	na	--	3.00E+01	1.04E+01	na	--	--	--	--	--	--	--	--	--	3.00E+01	1.04E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.4E+04	--	--	--	--	--	--	--	--	--	--	na	8.4E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	o	3.4E+02	1.5E+02	na	--	3.5E+02	3.1E+02	na	--	--	--	--	--	--	--	--	--	3.5E+02	3.1E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	--	--	na	1.1E+03
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	4.2E-03	--	--	--	--	--	--	--	--	--	--	na	4.2E-03
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.4E+05	--	--	--	--	--	--	--	--	--	--	na	1.4E+05
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	4.6E+01	--	--	--	--	--	--	--	--	--	--	na	4.6E+01
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	2.9E+03	--	--	--	--	--	--	--	--	--	--	na	2.9E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03
Cadmium	0	4.8E+00	1.2E+00	na	--	4.9E+00	2.5E+00	na	--	--	--	--	--	--	--	--	--	4.9E+00	2.5E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	3.3E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.5E+00	8.8E-03	na	1.7E-02	--	--	--	--	--	--	--	--	2.5E+00	8.8E-03	na	1.7E-02
Chloride	0	8.6E+05	2.3E+05	na	--	8.8E+05	4.7E+05	na	--	--	--	--	--	--	--	--	--	8.8E+05	4.7E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	--	--	na	3.3E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	2.7E+02	--	--	--	--	--	--	--	--	--	--	na	2.7E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.3E+04	--	--	--	--	--	--	--	--	--	--	na	2.3E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	--	--	na	3.3E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.1E+02	--	--	--	--	--	--	--	--	--	--	na	3.1E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.5E-02	8.4E-02	na	--	--	--	--	--	--	--	--	--	8.5E-02	8.4E-02	na	--
Chromium III	0	6.6E+02	8.0E+01	na	--	6.7E+02	1.6E+02	na	--	--	--	--	--	--	--	--	--	6.7E+02	1.6E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	3.8E-02	--	--	--	--	--	--	--	--	--	--	na	3.8E-02
Copper	0	1.6E+01	9.7E+00	na	--	1.6E+01	2.0E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	2.0E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	1.1E+01	na	3.3E+04	--	--	--	--	--	--	--	--	2.2E+01	1.1E+01	na	3.3E+04
DDD [C]	0	--	--	na	3.1E-03	--	--	na	6.5E-03	--	--	--	--	--	--	--	--	--	--	na	6.5E-03
DDE [C]	0	--	--	na	2.2E-03	--	--	na	4.6E-03	--	--	--	--	--	--	--	--	--	--	na	4.6E-03
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	2.0E-03	na	4.6E-03	--	--	--	--	--	--	--	--	1.1E+00	2.0E-03	na	4.6E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	3.5E-01	na	--	--	--	--	--	--	--	--	--	1.7E-01	3.5E-01	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.7E+03	--	--	--	--	--	--	--	--	--	--	na	2.7E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	4.0E+02	--	--	--	--	--	--	--	--	--	--	na	4.0E+02
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	5.9E-01	--	--	--	--	--	--	--	--	--	--	na	5.9E-01
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	7.7E+02	--	--	--	--	--	--	--	--	--	--	na	7.7E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	na	1.5E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	6.1E+02	--	--	--	--	--	--	--	--	--	--	na	6.1E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	3.1E+02	--	--	--	--	--	--	--	--	--	--	na	3.1E+02
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	4.4E+02	--	--	--	--	--	--	--	--	--	--	na	4.4E+02
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.5E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	2.5E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	9.2E+04	--	--	--	--	--	--	--	--	--	--	na	9.2E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.8E+03	--	--	--	--	--	--	--	--	--	--	na	1.8E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.3E+06	--	--	--	--	--	--	--	--	--	--	na	2.3E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.4E+03	--	--	--	--	--	--	--	--	--	--	na	9.4E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.9E+02	--	--	--	--	--	--	--	--	--	--	na	5.9E+02
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	7.1E+01	--	--	--	--	--	--	--	--	--	--	na	7.1E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.1E-07	--	--	--	--	--	--	--	--	--	--	na	1.1E-07
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	4.2E+00	--	--	--	--	--	--	--	--	--	--	na	4.2E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	1.1E-01	na	1.9E+02	--	--	--	--	--	--	--	--	2.2E-01	1.1E-01	na	1.9E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	1.1E-01	na	1.9E+02	--	--	--	--	--	--	--	--	2.2E-01	1.1E-01	na	1.9E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	2.2E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	--	--	na	1.9E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.8E-02	7.3E-02	na	1.3E-01	--	--	--	--	--	--	--	--	8.8E-02	7.3E-02	na	1.3E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.3E-01	--	--	--	--	--	--	--	--	--	--	na	6.3E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.4E+03	--	--	--	--	--	--	--	--	--	--	na	4.4E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.9E+02	--	--	--	--	--	--	--	--	--	--	na	2.9E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	5.3E-01	7.7E-03	na	1.7E-03	--	--	--	--	--	--	--	--	5.3E-01	7.7E-03	na	1.7E-03
Heptachlor Epoxide [C]	0	5.2E-01	3.8E-03	na	3.9E-04	5.3E-01	7.7E-03	na	8.2E-04	--	--	--	--	--	--	--	--	5.3E-01	7.7E-03	na	8.2E-04
Hexachlorobenzene [C]	0	--	--	na	2.9E-03	--	--	na	6.1E-03	--	--	--	--	--	--	--	--	--	--	na	6.1E-03
Hexachlorobutadiene [C]	0	--	--	na	1.8E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	na	4.9E-02	--	--	na	1.0E-01	--	--	--	--	--	--	--	--	--	--	na	1.0E-01
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	na	1.7E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	9.5E-01	na	na	1.8E+00	9.7E-01	--	na	3.8E+00	--	--	--	--	--	--	--	--	9.7E-01	--	na	3.8E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.3E+03	--	--	--	--	--	--	--	--	--	--	na	2.3E+03
Hexachloroethane [C]	0	--	--	na	3.3E+01	--	--	na	6.9E+01	--	--	--	--	--	--	--	--	--	--	na	6.9E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.1E+00	na	--	--	--	--	--	--	--	--	--	--	4.1E+00	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.8E-01	--	--	--	--	--	--	--	--	--	--	na	3.8E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone [C]	0	--	--	na	9.6E+03	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	1.5E+02	1.5E+01	na	--	1.5E+02	3.1E+01	na	--	--	--	--	--	--	--	--	--	1.5E+02	3.1E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+00	1.6E+00	--	--	--	--	--	--	--	--	--	--	1.4E+00	1.6E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.1E+03	--	--	--	--	--	--	--	--	--	--	na	3.1E+03
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.1E-02	na	--	--	--	--	--	--	--	--	--	--	6.1E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	2.1E+02	2.2E+01	na	4.6E+03	2.2E+02	4.5E+01	na	9.6E+03	--	--	--	--	--	--	--	--	2.2E+02	4.5E+01	na	9.6E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine [C]	0	--	--	na	3.0E+01	--	--	na	6.3E+01	--	--	--	--	--	--	--	--	--	--	na	6.3E+01
N-Nitrosodiphenylamine [C]	0	--	--	na	6.0E+01	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	1.3E+02
N-Nitrosodi-n-propylamine [C]	0	--	--	na	5.1E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.9E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	2.9E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.6E-02	2.6E-02	na	--	--	--	--	--	--	--	--	--	6.6E-02	2.6E-02	na	--
PCB Total [C]	0	--	1.4E-02	na	6.4E-04	--	2.9E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.9E-02	na	1.3E-03
Pentachlorophenol [C]	0	4.8E+00	4.4E+00	na	3.0E+01	4.9E+00	9.0E+00	na	6.3E+01	--	--	--	--	--	--	--	--	4.9E+00	9.0E+00	na	6.3E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.8E+06	--	--	--	--	--	--	--	--	--	--	na	1.8E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.4E+03	--	--	--	--	--	--	--	--	--	--	na	8.4E+03
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.4E+00	--	--	--	--	--	--	--	--	--	--	na	8.4E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	1.0E+01	na	8.8E+03	--	--	--	--	--	--	--	--	**2.0E+01**	**1.0E+01**	**na**	**8.8E+03**
Silver	0	4.6E+00	--	na	--	4.7E+00	--	na	--	--	--	--	--	--	--	--	--	**4.7E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	8.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.4E+01**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	6.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.9E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	9.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.8E-01**
Toluene	0	--	--	na	6.0E+03	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	7.5E-01	4.1E-04	na	5.9E-03	--	--	--	--	--	--	--	--	**7.5E-01**	**4.1E-04**	**na**	**5.9E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.7E-01	1.5E-01	na	--	--	--	--	--	--	--	--	--	**4.7E-01**	**1.5E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	3.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+02**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	6.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.3E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	5.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.0E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	5.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.0E+01**
Zinc	0	1.4E+02	1.3E+02	na	2.6E+04	1.4E+02	2.6E+02	na	5.4E+04	--	--	--	--	--	--	--	--	**1.4E+02**	**2.6E+02**	**na**	**5.4E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.4E+02
Barium	na
Cadmium	1.5E+00
Chromium III	9.8E+01
Chromium VI	6.5E+00
Copper	6.4E+00
Iron	na
Lead	1.9E+01
Manganese	na
Mercury	5.7E-01
Nickel	2.7E+01
Selenium	6.1E+00
Silver	1.9E+00
Zinc	5.5E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

ATTACHMENT 10

Mixing Analysis

Mixing Zone Predictions for Alexandria Renew

Low Flow

Effluent Flow = 54 MGD
Stream 7Q10 = 1.62 MGD
Stream 30Q10 = 1.62 MGD
Stream 1Q10 = 1.16 MGD
Stream slope = 0.0001 ft/ft
Stream width = 247 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.7733 ft
Length = 35799.29 ft
Velocity = .1966 ft/sec
Residence Time = 2.1079 days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 94.88% of the 7Q10 is used.

Mixing Zone Predictions @ 30Q10

Depth = 1.7733 ft
Length = 35799.29 ft
Velocity = .1966 ft/sec
Residence Time = 2.1079 days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 94.88% of the 30Q10 is used.

Mixing Zone Predictions @ 1Q10

Depth = 1.7644 ft
Length = 35950.91 ft
Velocity = .1959 ft/sec
Residence Time = 50.9704 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 1.96% of the 1Q10 is used.

Mixing Zone Predictions for Alexandria Renew

Effluent Flow = 54 MGD
Stream 7Q10 = 3.36 MGD
Stream 30Q10 = 3.36 MGD
Stream 1Q10 = 2.58 MGD
Stream slope = 0.0001 ft/ft
Stream width = 247 ft
Bottom scale = 3
Channel scale = 1

High Flow

Mixing Zone Predictions @ 7Q10

Depth = 1.8066 ft
Length = 35242.77 ft
Velocity = .199 ft/sec
Residence Time = 2.0499 days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 97.57% of the 7Q10 is used.

Mixing Zone Predictions @ 30Q10

Depth = 1.8066 ft
Length = 35242.77 ft
Velocity = .199 ft/sec
Residence Time = 2.0499 days

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 97.57% of the 30Q10 is used.

Mixing Zone Predictions @ 1Q10

Depth = 1.7917 ft
Length = 35489.04 ft
Velocity = .1979 ft/sec
Residence Time = 49.8109 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 2.01% of the 1Q10 is used.

ATTACHMENT 11

Effluent pH Data
June 2009 – September 2013

DMR QA/QC

Permit #:VA0025160

Facility:Alexandria Renew Enterprises WTP

Outfall	Rec'd	Parameter Description	QTY AVG	Lim Avg	QTY MAX	Lim Max	Quantity Unit Lim	CONC MIN	Lim Min	CONC AVG	Lim Avg	CONC MAX	Lim Max	Concentration Unit Lim
001	13-Jul-2009	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.6	9.0	SU
001	10-Aug-2009	PH	NULL	*********	NULL	*********	NULL	6.6	6.0	NULL	*********	6.8	9.0	SU
001	10-Sep-2009	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.8	9.0	SU
001	09-Oct-2009	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.8	9.0	SU
001	10-Nov-2009	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.8	9.0	SU
001	11-Dec-2009	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.6	9.0	SU
001	11-Jan-2010	PH	NULL	*********	NULL	*********	NULL	6.4	6.0	NULL	*********	6.6	9.0	SU
001	11-Feb-2010	PH	NULL	*********	NULL	*********	NULL	6.4	6.0	NULL	*********	6.6	9.0	SU
001	10-Mar-2010	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.7	9.0	SU
001	08-Apr-2010	PH	NULL	*********	NULL	*********	NULL	6.4	6.0	NULL	*********	6.6	9.0	SU
001	11-May-2010	PH	NULL	*********	NULL	*********	NULL	6.4	6.0	NULL	*********	6.6	9.0	SU
001	11-Jun-2010	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.7	9.0	SU
001	09-Jul-2010	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.8	9.0	SU
001	09-Aug-2010	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.6	9.0	SU
001	10-Sep-2010	PH	NULL	*********	NULL	*********	NULL	6.4	6.0	NULL	*********	6.8	9.0	SU
001	07-Oct-2010	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	7.0	9.0	SU
001	09-Nov-2010	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.8	9.0	SU
001	08-Dec-2010	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.8	9.0	SU
001	06-Jan-2011	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.8	9.0	SU
001	10-Feb-2011	PH	NULL	*********	NULL	*********	NULL	6.4	6.0	NULL	*********	8.0	9.0	SU
001	08-Mar-2011	PH	NULL	*********	NULL	*********	NULL	6.4	6.0	NULL	*********	6.6	9.0	SU
001	07-Apr-2011	PH	NULL	*********	NULL	*********	NULL	6.2	6.0	NULL	*********	6.6	9.0	SU
001	09-May-2011	PH	NULL	*********	NULL	*********	NULL	6.3	6.0	NULL	*********	6.7	9.0	SU
001	09-Jun-2011	PH	NULL	*********	NULL	*********	NULL	6.4	6.0	NULL	*********	7.0	9.0	SU
001	08-Jul-2011	PH	NULL	*********	NULL	*********	NULL	6.7	6.0	NULL	*********	7.0	9.0	SU
001	09-Aug-2011	PH	NULL	*********	NULL	*********	NULL	6.6	6.0	NULL	*********	7.1	9.0	SU
001	09-Sep-2011	PH	NULL	*********	NULL	*********	NULL	6.8	6.0	NULL	*********	7.2	9.0	SU
001	07-Oct-2011	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	7.1	9.0	SU
001	09-Nov-2011	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	7.1	9.0	SU
001	09-Dec-2011	PH	NULL	*********	NULL	*********	NULL	6.9	6.0	NULL	*********	7.2	9.0	SU
001	10-Jan-2012	PH	NULL	*********	NULL	*********	NULL	6.7	6.0	NULL	*********	7.1	9.0	SU
001	08-Feb-2012	PH	NULL	*********	NULL	*********	NULL	6.8	6.0	NULL	*********	7.0	9.0	SU
001	09-Mar-2012	PH	NULL	*********	NULL	*********	NULL	6.8	6.0	NULL	*********	7.1	9.0	SU
001	10-Apr-2012	PH	NULL	*********	NULL	*********	NULL	6.7	6.0	NULL	*********	7.3	9.0	SU
001	08-May-2012	PH	NULL	*********	NULL	*********	NULL	6.6	6.0	NULL	*********	7.1	9.0	SU

001	08-Jun-2012	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.9	9.0	SU
001	09-Jul-2012	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	7.0	9.0	SU
001	09-Aug-2012	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	6.9	9.0	SU
001	07-Sep-2012	PH	NULL	*********	NULL	*********	NULL	6.6	6.0	NULL	*********	7.3	9.0	SU
001	09-Oct-2012	PH	NULL	*********	NULL	*********	NULL	6.9	6.0	NULL	*********	7.4	9.0	SU
001	09-Nov-2012	PH	NULL	*********	NULL	*********	NULL	6.9	6.0	NULL	*********	7.2	9.0	SU
001	10-Dec-2012	PH	NULL	*********	NULL	*********	NULL	6.7	6.0	NULL	*********	7.1	9.0	SU
001	10-Jan-2013	PH	NULL	*********	NULL	*********	NULL	6.8	6.0	NULL	*********	7.2	9.0	SU
001	07-Feb-2013	PH	NULL	*********	NULL	*********	NULL	6.7	6.0	NULL	*********	7.1	9.0	SU
001	08-Mar-2013	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	7.3	9.0	SU
001	10-Apr-2013	PH	NULL	*********	NULL	*********	NULL	6.7	6.0	NULL	*********	7.0	9.0	SU
001	09-May-2013	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	7.0	9.0	SU
001	10-Jun-2013	PH	NULL	*********	NULL	*********	NULL	6.5	6.0	NULL	*********	7.0	9.0	SU
001	10-Jul-2013	PH	NULL	*********	NULL	*********	NULL	6.4	6.0	NULL	*********	7.2	9.0	SU
001	09-Aug-2013	PH	NULL	*********	NULL	*********	NULL	6.6	6.0	NULL	*********	7.2	9.0	SU
001	09-Sep-2013	PH	NULL	*********	NULL	*********	NULL	6.6	6.0	NULL	*********	7.1	9.0	SU
001	10-Oct-2013	PH	NULL	*********	NULL	*********	NULL	6.7	6.0	NULL	*********	7.1	9.0	SU
										90th	7.2			
										10th	6.4			

ATTACHMENT 12

Effluent Data
June 2009 – September 2013

DMR QA/QC

Permit #:VA0025160

Facility:Alexandria Renew Enterprises WTP

Rec'd	Parameter Description	QTY AVG	Lim Avg	QTY MAX	Lim Max	Quantity Unit Lim	CONC MIN	Lim Min	CONC AVG	Lim Avg	CONC MAX	Lim Max	Concentration Unit Lim
13-Jul-2009	AMMONIA, AS N APR-OCT	<QL	204	<QL	899	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
10-Aug-2009	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
10-Sep-2009	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
09-Oct-2009	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
10-Nov-2009	AMMONIA, AS N APR-OCT	1	200	6	900	KG/D	NULL	*********	0.0	1.0	0.1	4.4	MG/L
11-May-2010	AMMONIA, AS N APR-OCT	16	200	29	900	KG/D	NULL	*********	0.1	1.0	0.2	4.4	MG/L
11-Jun-2010	AMMONIA, AS N APR-OCT	9	200	34	900	KG/D	NULL	*********	0.1	1.0	0.3	4.4	MG/L
09-Jul-2010	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
09-Aug-2010	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
10-Sep-2010	AMMONIA, AS N APR-OCT	1	200	5	900	KG/D	NULL	*********	0.0	1.0	0.0	4.4	MG/L
07-Oct-2010	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
09-Nov-2010	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
09-May-2011	AMMONIA, AS N APR-OCT	5	200	13	900	KG/D	NULL	*********	0.0	1.0	0.1	4.4	MG/L
09-Jun-2011	AMMONIA, AS N APR-OCT	5	200	13	900	KG/D	NULL	*********	0.0	1.0	0.1	4.4	MG/L
08-Jul-2011	AMMONIA, AS N APR-OCT	1	200	5	900	KG/D	NULL	*********	0.0	1.0	0.0	4.4	MG/L
09-Aug-2011	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
09-Sep-2011	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
07-Oct-2011	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
09-Nov-2011	AMMONIA, AS N APR-OCT	2	200	8	900	KG/D	NULL	*********	0.0	1.0	0.0	4.4	MG/L
08-May-2012	AMMONIA, AS N APR-OCT	5	200	19	900	KG/D	NULL	*********	0.0	1.0	0.1	4.4	MG/L
08-Jun-2012	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
09-Jul-2012	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
09-Aug-2012	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
07-Sep-2012	AMMONIA, AS N APR-OCT	1	200	5	900	KG/D	NULL	*********	0.0	1.0	0.0	4.4	MG/L
09-Oct-2012	AMMONIA, AS N APR-OCT	3	200	14	900	KG/D	NULL	*********	0.0	1.0	0.1	4.4	MG/L
09-Nov-2012	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
09-May-2013	AMMONIA, AS N APR-OCT	7	200	13	900	KG/D	NULL	*********	0.0	1.0	0.1	4.4	MG/L
10-Jun-2013	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
10-Jul-2013	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
09-Aug-2013	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
09-Sep-2013	AMMONIA, AS N APR-OCT	<QL	200	<QL	900	KG/D	NULL	*********	<QL	1.0	<QL	4.4	MG/L
10-Oct-2013	AMMONIA, AS N APR-OCT	1	200	6	900	KG/D	NULL	*********	0.0	1.0	0.1	4.4	MG/L
10-Mar-2010	AMMONIA, AS N FEB-MAR	NULL	*********	NULL	*********	NULL	NULL	*********	0.2	6.9	0.4	8.5	MG/L
08-Apr-2010	AMMONIA, AS N FEB-MAR	NULL	*********	NULL	*********	NULL	NULL	*********	0.3	6.9	0.6	8.5	MG/L
08-Mar-2011	AMMONIA, AS N FEB-MAR	NULL	*********	NULL	*********	NULL	NULL	*********	0.1	6.9	0.1	8.5	MG/L

07-Apr-2011	AMMONIA, AS N FEB-MAR	NULL	*********	NULL	*********	NULL	NULL	*********	0.2	6.9	0.6	8.5	MG/L
09-Mar-2012	AMMONIA, AS N FEB-MAR	NULL	*********	NULL	*********	NULL	NULL	*********	0.3	6.9	0.3	8.5	MG/L
10-Apr-2012	AMMONIA, AS N FEB-MAR	NULL	*********	NULL	*********	NULL	NULL	*********	0.0	6.9	0.0	8.5	MG/L
08-Mar-2013	AMMONIA, AS N FEB-MAR	NULL	*********	NULL	*********	NULL	NULL	*********	0.1	6.9	0.1	8.5	MG/L
10-Apr-2013	AMMONIA, AS N FEB-MAR	NULL	*********	NULL	*********	NULL	NULL	*********	0.1	6.9	0.3	8.5	MG/L
11-Dec-2009	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	<QL	8.4	<QL	10	MG/L
11-Jan-2010	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	0.1	8.4	0.1	10	MG/L
11-Feb-2010	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	0.2	8.4	0.3	10	MG/L
08-Dec-2010	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	0.1	8.4	0.1	10	MG/L
06-Jan-2011	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	0.1	8.4	0.0	10	MG/L
10-Feb-2011	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	0.1	8.4	0.2	10	MG/L
09-Dec-2011	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	<QL	8.4	<QL	10	MG/L
10-Jan-2012	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	0.1	8.4	0.1	10	MG/L
08-Feb-2012	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	0.3	8.4	0.6	10	MG/L
10-Dec-2012	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	<QL	8.4	<QL	10	MG/L
10-Jan-2013	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	0.1	8.4	0.3	10	MG/L
07-Feb-2013	AMMONIA, AS N NOV-JAN	NULL	*********	NULL	*********	NULL	NULL	*********	0.1	8.4	0.1	10	MG/L
13-Jul-2009	CBOD5	<QL	2041	<QL	3062	KG/D	NULL	*********	<QL	10	<QL	15	MG/L
10-Aug-2009	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Sep-2009	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Oct-2009	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Nov-2009	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
11-Dec-2009	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
11-Jan-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
11-Feb-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Mar-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
08-Apr-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
11-May-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
11-Jun-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Jul-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Aug-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Sep-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
07-Oct-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Nov-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
08-Dec-2010	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
06-Jan-2011	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Feb-2011	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
08-Mar-2011	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
07-Apr-2011	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-May-2011	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Jun-2011	CBOD5	9	1000	38	1600	KG/D	NULL	*********	0	5	0	8	MG/L
08-Jul-2011	CBOD5	8	1000	33	1600	KG/D	NULL	*********	0	5	0	8	MG/L
09-Aug-2011	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L

09-Sep-2011	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
07-Oct-2011	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Nov-2011	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Dec-2011	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Jan-2012	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
08-Feb-2012	CBOD5	28	1000	124	1600	KG/D	NULL	*********	0	5	1	8	MG/L
09-Mar-2012	CBOD5	12	1000	<QL	1600	KG/D	NULL	*********	0	5	<QL	8	MG/L
10-Apr-2012	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
08-May-2012	CBOD5	12	1000	51	1600	KG/D	NULL	*********	0	5	0	8	MG/L
08-Jun-2012	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Jul-2012	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Aug-2012	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
07-Sep-2012	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Oct-2012	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Nov-2012	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Dec-2012	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Jan-2013	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
07-Feb-2013	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
08-Mar-2013	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Apr-2013	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-May-2013	CBOD5	9	1000	<QL	1600	KG/D	NULL	*********	0	5	<QL	8	MG/L
10-Jun-2013	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Jul-2013	CBOD5	9	1000	38	1600	KG/D	NULL	*********	0	5	0	8	MG/L
09-Aug-2013	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
09-Sep-2013	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Oct-2013	CBOD5	<QL	1000	<QL	1600	KG/D	NULL	*********	<QL	5	<QL	8	MG/L
10-Aug-2009	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.7	NL	NULL	*********	MG/L
10-Sep-2009	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.3	NL	NULL	*********	MG/L
09-Oct-2009	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.8	NL	NULL	*********	MG/L
10-Nov-2009	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.6	NL	NULL	*********	MG/L
11-Dec-2009	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	4.2	NL	NULL	*********	MG/L
11-Jan-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.6	NL	NULL	*********	MG/L
11-Feb-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.7	NL	NULL	*********	MG/L
10-Mar-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	4.5	NL	NULL	*********	MG/L
08-Apr-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.3	NL	NULL	*********	MG/L
11-May-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.8	NL	NULL	*********	MG/L
11-Jun-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.5	NL	NULL	*********	MG/L
09-Jul-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.0	NL	NULL	*********	MG/L
09-Aug-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.0	NL	NULL	*********	MG/L
10-Sep-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.8	NL	NULL	*********	MG/L
07-Oct-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.8	NL	NULL	*********	MG/L
09-Nov-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.4	NL	NULL	*********	MG/L
08-Dec-2010	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.5	NL	NULL	*********	MG/L

06-Jan-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.2	NL	NULL	*********	MG/L
10-Feb-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.9	NL	NULL	*********	MG/L
08-Mar-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.3	NL	NULL	*********	MG/L
07-Apr-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.9	NL	NULL	*********	MG/L
09-May-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.2	NL	NULL	*********	MG/L
09-Jun-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.5	NL	NULL	*********	MG/L
08-Jul-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.7	NL	NULL	*********	MG/L
09-Aug-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.3	NL	NULL	*********	MG/L
09-Sep-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.2	NL	NULL	*********	MG/L
07-Oct-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.2	NL	NULL	*********	MG/L
09-Nov-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.1	NL	NULL	*********	MG/L
09-Dec-2011	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.0	NL	NULL	*********	MG/L
10-Jan-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.5	NL	NULL	*********	MG/L
08-Feb-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.5	NL	NULL	*********	MG/L
09-Mar-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.0	NL	NULL	*********	MG/L
10-Apr-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.1	NL	NULL	*********	MG/L
08-May-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	1.7	NL	NULL	*********	MG/L
08-Jun-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	1.5	NL	NULL	*********	MG/L
09-Jul-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	1.5	NL	NULL	*********	MG/L
09-Aug-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	1.4	NL	NULL	*********	MG/L
07-Sep-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	1.4	NL	NULL	*********	MG/L
09-Oct-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.3	NL	NULL	*********	MG/L
09-Nov-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	5.4	NL	NULL	*********	MG/L
10-Dec-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	6.4	NL	NULL	*********	MG/L
10-Jan-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	3.6	NL	NULL	*********	MG/L
07-Feb-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.9	NL	NULL	*********	MG/L
08-Mar-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.4	NL	NULL	*********	MG/L
10-Apr-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	2.3	NL	NULL	*********	MG/L
09-May-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	1.6	NL	NULL	*********	MG/L
10-Jun-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	1.8	NL	NULL	*********	MG/L
10-Jul-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	6.2	NL	NULL	*********	MG/L
09-Aug-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	5.6	NL	NULL	*********	MG/L
09-Sep-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	0.8	NL	NULL	*********	MG/L
10-Oct-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	NULL	*********	1.5	NL	NULL	*********	MG/L
10-Aug-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.5	NL	NULL	*********	MG/L
10-Sep-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.1	NL	NULL	*********	MG/L
09-Oct-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.8	NL	NULL	*********	MG/L
10-Nov-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.5	NL	NULL	*********	MG/L
11-Dec-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.9	NL	NULL	*********	MG/L
11-Jan-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.3	NL	NULL	*********	MG/L
11-Feb-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.6	NL	NULL	*********	MG/L
10-Mar-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	5.6	NL	NULL	*********	MG/L
08-Apr-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.5	NL	NULL	*********	MG/L

11-May-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.9	NL	NULL	*********	MG/L
11-Jun-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.4	NL	NULL	*********	MG/L
09-Jul-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	2.8	NL	NULL	*********	MG/L
09-Aug-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.8	NL	NULL	*********	MG/L
10-Sep-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.6	NL	NULL	*********	MG/L
07-Oct-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.7	NL	NULL	*********	MG/L
09-Nov-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.3	NL	NULL	*********	MG/L
08-Dec-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.6	NL	NULL	*********	MG/L
06-Jan-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.1	NL	NULL	*********	MG/L
10-Feb-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
08-Mar-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.4	NL	NULL	*********	MG/L
07-Apr-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.1	NL	NULL	*********	MG/L
09-May-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.1	NL	NULL	*********	MG/L
09-Jun-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.4	NL	NULL	*********	MG/L
08-Jul-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.6	NL	NULL	*********	MG/L
09-Aug-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.3	NL	NULL	*********	MG/L
09-Sep-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.2	NL	NULL	*********	MG/L
07-Oct-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.2	NL	NULL	*********	MG/L
09-Nov-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.1	NL	NULL	*********	MG/L
09-Dec-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
10-Jan-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.4	NL	NULL	*********	MG/L
08-Feb-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.7	NL	NULL	*********	MG/L
09-Mar-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.3	NL	NULL	*********	MG/L
10-Apr-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.1	NL	NULL	*********	MG/L
08-May-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	2.6	NL	NULL	*********	MG/L
08-Jun-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	2.6	NL	NULL	*********	MG/L
09-Jul-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	2.8	NL	NULL	*********	MG/L
09-Aug-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	2.5	NL	NULL	*********	MG/L
07-Sep-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	2.4	NL	NULL	*********	MG/L
09-Oct-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.5	NL	NULL	*********	MG/L
09-Nov-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	6.6	NL	NULL	*********	MG/L
10-Dec-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	7.5	NL	NULL	*********	MG/L
10-Jan-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.7	NL	NULL	*********	MG/L
07-Feb-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.4	NL	NULL	*********	MG/L
08-Mar-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.6	NL	NULL	*********	MG/L
10-Apr-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.7	NL	NULL	*********	MG/L
09-May-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	2.4	NL	NULL	*********	MG/L
10-Jun-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	2.6	NL	NULL	*********	MG/L
10-Jul-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	7.1	NL	NULL	*********	MG/L
09-Aug-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	6.4	NL	NULL	*********	MG/L
09-Sep-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	1.5	NL	NULL	*********	MG/L
10-Oct-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	2.3	NL	NULL	*********	MG/L
10-Aug-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.6	6.0	NULL	*********	MG/L

10-Sep-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	NR	6.0	NULL	*********	MG/L
10-Nov-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	NR	6.0	NULL	*********	MG/L
11-Dec-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	NR	6.0	NULL	*********	MG/L
11-Jan-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.9	6.0	NULL	*********	MG/L
11-Feb-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	NR	6.0	NULL	*********	MG/L
10-Mar-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	NR	6.0	NULL	*********	MG/L
08-Apr-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	NR	6.0	NULL	*********	MG/L
11-May-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	NR	6.0	NULL	*********	MG/L
11-Jun-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	NR	6.0	NULL	*********	MG/L
09-Jul-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.1	6.0	NULL	*********	MG/L
10-Sep-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	NR	6.0	NULL	*********	MG/L
06-Jan-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	6.0	NULL	*********	MG/L
10-Jan-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.1	6.0	NULL	*********	MG/L
10-Jan-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.9	6.0	NULL	*********	MG/L
10-Aug-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	NULL	NL	NULL	*********	MG/L
10-Sep-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.7	NL	NULL	*********	MG/L
09-Oct-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.7	NL	NULL	*********	MG/L
10-Nov-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.8	NL	NULL	*********	MG/L
11-Dec-2009	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.9	NL	NULL	*********	MG/L
11-Jan-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.9	NL	NULL	*********	MG/L
11-Feb-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.6	NL	NULL	*********	MG/L
10-Mar-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.6	NL	NULL	*********	MG/L
08-Apr-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.6	NL	NULL	*********	MG/L
11-May-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.7	NL	NULL	*********	MG/L
11-Jun-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.4	NL	NULL	*********	MG/L
09-Jul-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	NULL	NL	NULL	*********	MG/L
09-Aug-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.1	NL	NULL	*********	MG/L
10-Sep-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
07-Oct-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
09-Nov-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.9	NL	NULL	*********	MG/L
08-Dec-2010	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
06-Jan-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
10-Feb-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
08-Mar-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.2	NL	NULL	*********	MG/L
07-Apr-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.2	NL	NULL	*********	MG/L
09-May-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.2	NL	NULL	*********	MG/L
09-Jun-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
08-Jul-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.9	NL	NULL	*********	MG/L
09-Aug-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
09-Sep-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
07-Oct-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
09-Nov-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
09-Dec-2011	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L

10-Jan-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.1	NL	NULL	*********	MG/L
08-Feb-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.7	NL	NULL	*********	MG/L
09-Mar-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.5	NL	NULL	*********	MG/L
10-Apr-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
08-May-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.7	NL	NULL	*********	MG/L
08-Jun-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.5	NL	NULL	*********	MG/L
09-Jul-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.4	NL	NULL	*********	MG/L
09-Aug-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.2	NL	NULL	*********	MG/L
07-Sep-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.1	NL	NULL	*********	MG/L
09-Oct-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.2	NL	NULL	*********	MG/L
09-Nov-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.5	NL	NULL	*********	MG/L
10-Dec-2012	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.9	NL	NULL	*********	MG/L
10-Jan-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.9	NL	NULL	*********	MG/L
07-Feb-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.4	NL	NULL	*********	MG/L
08-Mar-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
10-Apr-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.9	NL	NULL	*********	MG/L
09-May-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.5	NL	NULL	*********	MG/L
10-Jun-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.3	NL	NULL	*********	MG/L
10-Jul-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
09-Aug-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.3	NL	NULL	*********	MG/L
09-Sep-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	4.0	NL	NULL	*********	MG/L
10-Oct-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	NULL	*********	3.8	NL	NULL	*********	MG/L
13-Jul-2009	PHOSPHORUS, TOTAL (AS P)	13	81	13	122	KG/D	NULL	*********	0.08	0.4	0.10	0.6	MG/L
10-Aug-2009	PHOSPHORUS, TOTAL (AS P)	30	81	33	120	LBS/D	NULL	*********	0.11	0.18	0.12	0.27	MG/L
10-Sep-2009	PHOSPHORUS, TOTAL (AS P)	24	81	27	120	LBS/D	NULL	*********	0.09	0.18	0.11	0.27	MG/L
09-Oct-2009	PHOSPHORUS, TOTAL (AS P)	26	81	30	120	LBS/D	NULL	*********	0.11	0.18	0.12	0.27	MG/L
10-Nov-2009	PHOSPHORUS, TOTAL (AS P)	41	81	62	120	LBS/D	NULL	*********	0.14	0.18	0.22	0.27	MG/L
11-Dec-2009	PHOSPHORUS, TOTAL (AS P)	24	81	26	120	LBS/D	NULL	*********	0.07	0.18	0.08	0.27	MG/L
11-Jan-2010	PHOSPHORUS, TOTAL (AS P)	22	81	31	120	LBS/D	NULL	*********	0.05	0.18	0.06	0.27	MG/L
11-Feb-2010	PHOSPHORUS, TOTAL (AS P)	14	81	18	120	LBS/D	NULL	*********	0.04	0.18	0.06	0.27	MG/L
10-Mar-2010	PHOSPHORUS, TOTAL (AS P)	17	81	33	120	LBS/D	NULL	*********	0.04	0.18	0.07	0.27	MG/L
08-Apr-2010	PHOSPHORUS, TOTAL (AS P)	39	81	42	120	LBS/D	NULL	*********	0.10	0.18	0.10	0.27	MG/L
11-May-2010	PHOSPHORUS, TOTAL (AS P)	27	81	29	120	LBS/D	NULL	*********	0.09	0.18	0.10	0.27	MG/L
11-Jun-2010	PHOSPHORUS, TOTAL (AS P)	25	81	33	120	LBS/D	NULL	*********	0.09	0.18	0.12	0.27	MG/L
09-Jul-2010	PHOSPHORUS, TOTAL (AS P)	23	81	32	120	LBS/D	NULL	*********	0.09	0.18	0.12	0.27	MG/L
09-Aug-2010	PHOSPHORUS, TOTAL (AS P)	21	81	27	120	LBS/D	NULL	*********	0.08	0.18	0.09	0.27	MG/L
10-Sep-2010	PHOSPHORUS, TOTAL (AS P)	12	81	14	120	LBS/D	NULL	*********	0.05	0.18	0.05	0.27	MG/L
07-Oct-2010	PHOSPHORUS, TOTAL (AS P)	21	81	19	120	LBS/D	NULL	*********	0.08	0.18	0.08	0.27	MG/L
09-Nov-2010	PHOSPHORUS, TOTAL (AS P)	32	81	33	120	LBS/D	NULL	*********	0.11	0.18	0.12	0.27	MG/L
08-Dec-2010	PHOSPHORUS, TOTAL (AS P)	18	81	22	120	LBS/D	NULL	*********	0.06	0.18	0.08	0.27	MG/L
06-Jan-2011	PHOSPHORUS, TOTAL (AS P)	10	81	12	120	LBS/D	NULL	*********	0.04	0.18	0.05	0.27	MG/L
10-Feb-2011	PHOSPHORUS, TOTAL (AS P)	16	81	21	120	LBS/D	NULL	*********	0.06	0.18	0.08	0.27	MG/L
08-Mar-2011	PHOSPHORUS, TOTAL (AS P)	20	81	23	120	LBS/D	NULL	*********	0.07	0.18	0.09	0.27	MG/L

07-Apr-2011	PHOSPHORUS, TOTAL (AS P)	18	81	32	120	LBS/D	NULL	*********	0.05	0.18	0.07	0.27	MG/L
09-May-2011	PHOSPHORUS, TOTAL (AS P)	18	81	29	120	LBS/D	NULL	*********	0.06	0.18	0.09	0.27	MG/L
09-Jun-2011	PHOSPHORUS, TOTAL (AS P)	19	81	24	120	LBS/D	NULL	*********	0.07	0.18	0.08	0.27	MG/L
08-Jul-2011	PHOSPHORUS, TOTAL (AS P)	17	81	24	120	LBS/D	NULL	*********	0.06	0.18	0.09	0.27	MG/L
09-Aug-2011	PHOSPHORUS, TOTAL (AS P)	16	81	25	120	LBS/D	NULL	*********	0.06	0.18	0.10	0.27	MG/L
09-Sep-2011	PHOSPHORUS, TOTAL (AS P)	9	81	11	120	LBS/D	NULL	*********	0.03	0.18	0.04	0.27	MG/L
07-Oct-2011	PHOSPHORUS, TOTAL (AS P)	19	81	48	120	LBS/D	NULL	*********	0.04	0.18	0.07	0.27	MG/L
09-Nov-2011	PHOSPHORUS, TOTAL (AS P)	11	81	15	120	LBS/D	NULL	*********	0.04	0.18	0.05	0.27	MG/L
09-Dec-2011	PHOSPHORUS, TOTAL (AS P)	10	81	13	120	LBS/D	NULL	*********	0.04	0.18	0.04	0.27	MG/L
10-Jan-2012	PHOSPHORUS, TOTAL (AS P)	17	81	23	120	LBS/D	NULL	*********	0.05	0.18	0.07	0.27	MG/L
08-Feb-2012	PHOSPHORUS, TOTAL (AS P)	12	81	15	120	LBS/D	NULL	*********	0.04	0.18	0.05	0.27	MG/L
09-Mar-2012	PHOSPHORUS, TOTAL (AS P)	27	81	28	120	LBS/D	NULL	*********	0.10	0.18	0.10	0.27	MG/L
10-Apr-2012	PHOSPHORUS, TOTAL (AS P)	28	81	32	120	LBS/D	NULL	*********	0.10	0.18	0.12	0.27	MG/L
08-May-2012	PHOSPHORUS, TOTAL (AS P)	29	81	32	120	LBS/D	NULL	*********	0.11	0.18	0.12	0.27	MG/L
08-Jun-2012	PHOSPHORUS, TOTAL (AS P)	28	81	30	120	LBS/D	NULL	*********	0.10	0.18	0.11	0.27	MG/L
09-Jul-2012	PHOSPHORUS, TOTAL (AS P)	20	81	21	120	LBS/D	NULL	*********	0.08	0.18	0.08	0.27	MG/L
09-Aug-2012	PHOSPHORUS, TOTAL (AS P)	17	81	20	120	LBS/D	NULL	*********	0.06	0.18	0.08	0.27	MG/L
07-Sep-2012	PHOSPHORUS, TOTAL (AS P)	10	81	13	120	LBS/D	NULL	*********	0.04	0.18	0.05	0.27	MG/L
09-Oct-2012	PHOSPHORUS, TOTAL (AS P)	11	81	15	120	LBS/D	NULL	*********	0.04	0.18	0.05	0.27	MG/L
09-Nov-2012	PHOSPHORUS, TOTAL (AS P)	26	81	35	120	LBS/D	NULL	*********	0.08	0.18	0.13	0.27	MG/L
10-Dec-2012	PHOSPHORUS, TOTAL (AS P)	17	81	23	120	LBS/D	NULL	*********	0.06	0.18	0.08	0.27	MG/L
10-Jan-2013	PHOSPHORUS, TOTAL (AS P)	18	81	20	120	LBS/D	NULL	*********	0.06	0.18	0.07	0.27	MG/L
07-Feb-2013	PHOSPHORUS, TOTAL (AS P)	16	81	17	120	LBS/D	NULL	*********	0.05	0.18	0.06	0.27	MG/L
08-Mar-2013	PHOSPHORUS, TOTAL (AS P)	16	81	16	120	LBS/D	NULL	*********	0.05	0.18	0.05	0.27	MG/L
10-Apr-2013	PHOSPHORUS, TOTAL (AS P)	23	81	29	120	LBS/D	NULL	*********	0.07	0.18	0.09	0.27	MG/L
09-May-2013	PHOSPHORUS, TOTAL (AS P)	19	81	20	120	LBS/D	NULL	*********	0.06	0.18	0.07	0.27	MG/L
10-Jun-2013	PHOSPHORUS, TOTAL (AS P)	24	81	34	120	LBS/D	NULL	*********	0.09	0.18	0.12	0.27	MG/L
10-Jul-2013	PHOSPHORUS, TOTAL (AS P)	34	81	54	120	LBS/D	NULL	*********	0.10	0.18	0.14	0.27	MG/L
09-Aug-2013	PHOSPHORUS, TOTAL (AS P)	8	81	8	120	LBS/D	NULL	*********	0.03	0.18	0.02	0.27	MG/L
09-Sep-2013	PHOSPHORUS, TOTAL (AS P)	7	81	8	120	LBS/D	NULL	*********	0.03	0.18	0.03	0.27	MG/L
10-Oct-2013	PHOSPHORUS, TOTAL (AS P)	6	81	6	120	LBS/D	NULL	*********	0.03	0.18	0.03	0.27	MG/L
13-Jul-2009	TKN (N-KJEL)	107	NL	113	NL	KG/D	NULL	*********	0.7	NL	0.8	NL	MG/L
10-Aug-2009	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.8	NL	0.9	NL	MG/L
10-Sep-2009	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.8	NL	0.9	NL	MG/L
09-Oct-2009	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.0	NL	1.3	NL	MG/L
10-Nov-2009	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	0.9	NL	MG/L
11-Dec-2009	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.7	NL	0.8	NL	MG/L
11-Jan-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.7	NL	0.9	NL	MG/L
11-Feb-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	1.0	NL	MG/L
10-Mar-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.1	NL	1.3	NL	MG/L
08-Apr-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.2	NL	1.6	NL	MG/L
11-May-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.1	NL	1.2	NL	MG/L
11-Jun-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	1.3	NL	MG/L

09-Jul-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.8	NL	0.8	NL	MG/L
09-Aug-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.8	NL	0.9	NL	MG/L
10-Sep-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.8	NL	0.8	NL	MG/L
07-Oct-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	1.0	NL	MG/L
09-Nov-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	0.9	NL	MG/L
08-Dec-2010	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.1	NL	1.2	NL	MG/L
06-Jan-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	0.9	NL	MG/L
10-Feb-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.0	NL	1.2	NL	MG/L
08-Mar-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.1	NL	1.1	NL	MG/L
07-Apr-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.2	NL	1.7	NL	MG/L
09-May-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	1.0	NL	MG/L
09-Jun-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	1.1	NL	MG/L
08-Jul-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	0.9	NL	MG/L
09-Aug-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	1.1	NL	MG/L
09-Sep-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.0	NL	1.2	NL	MG/L
07-Oct-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	0.9	NL	MG/L
09-Nov-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.0	NL	1.1	NL	MG/L
09-Dec-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.0	NL	1.1	NL	MG/L
10-Jan-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.0	NL	1.0	NL	MG/L
08-Feb-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.2	NL	1.6	NL	MG/L
09-Mar-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.3	NL	1.4	NL	MG/L
10-Apr-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.0	NL	1.1	NL	MG/L
08-May-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.0	NL	1.0	NL	MG/L
08-Jun-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.1	NL	1.1	NL	MG/L
09-Jul-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.3	NL	1.3	NL	MG/L
09-Aug-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.1	NL	1.2	NL	MG/L
07-Sep-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.0	NL	1.1	NL	MG/L
09-Oct-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.2	NL	1.5	NL	MG/L
09-Nov-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.1	NL	1.3	NL	MG/L
10-Dec-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.1	NL	1.1	NL	MG/L
10-Jan-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.1	NL	1.3	NL	MG/L
07-Feb-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.5	NL	1.7	NL	MG/L
08-Mar-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.3	NL	1.3	NL	MG/L
10-Apr-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	1.4	NL	1.6	NL	MG/L
09-May-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.8	NL	0.9	NL	MG/L
10-Jun-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.7	NL	0.7	NL	MG/L
10-Jul-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.9	NL	1.1	NL	MG/L
09-Aug-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.7	NL	0.8	NL	MG/L
09-Sep-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.7	NL	0.7	NL	MG/L
10-Oct-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	NULL	*********	0.8	NL	0.9	NL	MG/L
13-Jul-2009	TSS	41	2450	50	3674	KG/D	NULL	*********	0.3	12	0.3	15	MG/L
10-Aug-2009	TSS	29	1200	75	1800	KG/D	NULL	*********	0.2	6.0	0.6	9.0	MG/L
10-Sep-2009	TSS	26	1200	43	1800	KG/D	NULL	*********	0.2	6.0	0.3	9.0	MG/L

09-Oct-2009	TSS	91	1200	157	1800	KG/D	NULL	*********	0.8	6.0	1.4	9.0	MG/L
10-Nov-2009	TSS	102	1200	180	1800	KG/D	NULL	*********	0.7	6.0	1.1	9.0	MG/L
11-Dec-2009	TSS	119	1200	180	1800	KG/D	NULL	*********	0.7	6.0	1.1	9.0	MG/L
11-Jan-2010	TSS	193	1200	374	1800	KG/D	NULL	*********	1.0	6.0	1.7	9.0	MG/L
11-Feb-2010	TSS	139	1200	213	1800	KG/D	NULL	*********	1.0	6.0	1.5	9.0	MG/L
10-Mar-2010	TSS	271	1200	766	1800	KG/D	NULL	*********	1.3	6.0	3.4	9.0	MG/L
08-Apr-2010	TSS	630	1200	651	1800	KG/D	NULL	*********	3.5	6.0	3.5	9.0	MG/L
11-May-2010	TSS	133	1200	219	1800	KG/D	NULL	*********	0.9	6.0	1.5	9.0	MG/L
11-Jun-2010	TSS	29	1200	82	1800	KG/D	NULL	*********	0.2	6.0	0.6	9.0	MG/L
09-Jul-2010	TSS	26	1200	87	1800	KG/D	NULL	*********	0.2	6.0	0.7	9.0	MG/L
09-Aug-2010	TSS	14	1200	22	1800	KG/D	NULL	*********	0.1	6.0	0.2	9.0	MG/L
10-Sep-2010	TSS	28	1200	37	1800	KG/D	NULL	*********	0.2	6.0	0.3	9.0	MG/L
07-Oct-2010	TSS	40	1200	49	1800	KG/D	NULL	*********	0.3	6.0	0.5	9.0	MG/L
09-Nov-2010	TSS	50	1200	76	1800	KG/D	NULL	*********	0.4	6.0	0.6	9.0	MG/L
08-Dec-2010	TSS	62	1200	97	1800	KG/D	NULL	*********	0.5	6.0	0.8	9.0	MG/L
06-Jan-2011	TSS	9	1200	17	1800	KG/D	NULL	*********	0.1	6.0	0.1	9.0	MG/L
10-Feb-2011	TSS	60	1200	132	1800	KG/D	NULL	*********	0.5	6.0	1.0	9.0	MG/L
08-Mar-2011	TSS	129	1200	168	1800	KG/D	NULL	*********	1.0	6.0	1.4	9.0	MG/L
07-Apr-2011	TSS	143	1200	265	1800	KG/D	NULL	*********	0.8	6.0	1.5	9.0	MG/L
09-May-2011	TSS	11	1200	27	1800	KG/D	NULL	*********	0.1	6.0	0.2	9.0	MG/L
09-Jun-2011	TSS	25	1200	40	1800	KG/D	NULL	*********	0.2	6.0	0.3	9.0	MG/L
08-Jul-2011	TSS	38	1200	58	1800	KG/D	NULL	*********	0.3	6.0	0.5	9.0	MG/L
09-Aug-2011	TSS	9	1200	39	1800	KG/D	NULL	*********	0.1	6.0	0.3	9.0	MG/L
09-Sep-2011	TSS	32	1200	75	1800	KG/D	NULL	*********	0.2	6.0	0.4	9.0	MG/L
07-Oct-2011	TSS	183	1200	717	1800	KG/D	NULL	*********	0.6	6.0	2.1	9.0	MG/L
09-Nov-2011	TSS	8	1200	34	1800	KG/D	NULL	*********	0.0	6.0	0.2	9.0	MG/L
09-Dec-2011	TSS	<QL	1200	<QL	1800	KG/D	NULL	*********	<QL	6.0	<QL	9.0	MG/L
10-Jan-2012	TSS	26	1200	96	1800	KG/D	NULL	*********	0.1	6.0	0.3	9.0	MG/L
08-Feb-2012	TSS	<QL	1200	<QL	1800	KG/D	NULL	*********	<QL	6.0	<QL	9.0	MG/L
09-Mar-2012	TSS	19	1200	20	1800	KG/D	NULL	*********	0.1	6.0	0.2	9.0	MG/L
10-Apr-2012	TSS	15	1200	21	1800	KG/D	NULL	*********	0.1	6.0	0.2	9.0	MG/L
08-May-2012	TSS	10	1200	25	1800	KG/D	NULL	*********	0.1	6.0	0.1	9.0	MG/L
08-Jun-2012	TSS	<QL	1200	<QL	1800	KG/D	NULL	*********	<QL	6.0	<QL	9.0	MG/L
09-Jul-2012	TSS	8	1200	34	1800	KG/D	NULL	*********	0.1	6.0	0.3	9.0	MG/L
09-Aug-2012	TSS	13	1200	41	1800	KG/D	NULL	*********	0.1	6.0	0.3	9.0	MG/L
07-Sep-2012	TSS	15	1200	52	1800	KG/D	NULL	*********	0.1	6.0	0.4	9.0	MG/L
09-Oct-2012	TSS	<QL	1200	<QL	1800	KG/D	NULL	*********	<QL	6.0	<QL	9.0	MG/L
09-Nov-2012	TSS	34	1200	<QL	1800	KG/D	NULL	*********	0.1	6.0	<QL	9.0	MG/L
10-Dec-2012	TSS	10	1200	18	1800	KG/D	NULL	*********	0.1	6.0	0.1	9.0	MG/L
10-Jan-2013	TSS	12	1200	32	1800	KG/D	NULL	*********	0.1	6.0	0.2	9.0	MG/L
07-Feb-2013	TSS	<QL	1200	<QL	1800	KG/D	NULL	*********	<QL	6.0	<QL	9.0	MG/L
08-Mar-2013	TSS	<QL	1200	<QL	1800	KG/D	NULL	*********	<QL	6.0	<QL	9.0	MG/L
10-Apr-2013	TSS	18	1200	39	1800	KG/D	NULL	*********	0.1	6.0	0.2	9.0	MG/L

09-May-2013	TSS	4	*1200*	<QL	*1800*	KG/D	NULL	*********	0.0	*6.0*	<QL	*9.0*	MG/L
10-Jun-2013	TSS	<QL	*1200*	<QL	*1800*	KG/D	NULL	*********	<QL	*6.0*	<QL	*9.0*	MG/L
10-Jul-2013	TSS	109	*1200*	159	*1800*	KG/D	NULL	*********	0.6	*6.0*	0.8	*9.0*	MG/L
09-Aug-2013	TSS	<QL	*1200*	<QL	*1800*	KG/D	NULL	*********	<QL	*6.0*	<QL	*9.0*	MG/L
09-Sep-2013	TSS	<QL	*1200*	<QL	*1800*	KG/D	NULL	*********	<QL	*6.0*	<QL	*9.0*	MG/L
10-Oct-2013	TSS	<QL	*1200*	<QL	*1800*	KG/D	NULL	*********	<QL	*6.0*	<QL	*9.0*	MG/L

ATTACHMENT 13

1997 Dilution Study
&
Correspondence

CO MONWEALTH OF VI INIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
Office of Permit Support
629 East Main Street Richmond, Virginia 23219

MEMORANDUM

Subject: Alexandria Dilution

To: April Young, NRO

From: M. Dale Phillips

Date: August 8, 1997

Copies:

I have reviewed the dilution studies submitted by Greeley and Hansen on behalf of the Alexandria Sanitation Authority and have the following comments:

1. The general approach seems to be consistent with our approach to controlling toxics, e.g., to ensure that passing or drifting organisms are not exposed to concentrations higher than the criterion for longer than the time specified in the standards.

2. The models used seem to be adequate for the approach taken. However, I would like to see some discussion of the means used to verify that DYNHYD is providing reasonable predictions.

3. The use of 2 days exposure rather than 4 days in our guidance has nothing to do with the presence of additional sources of pollutants. It was specifically to provide a conservative estimate to account for uncertainty associated with the models used for estimating the exposure time. I do not believe that the models in this study and the resulting predictions are sufficiently accurate to ignore some margin of safety. If they do not want to use the default of 2 days then I would suggest that they recommend some more valid factor and justify it.

   I would add that whatever the resolution of this issue the safety factor chosen will eventually have to pass the margin of safety criteria in the EPA TMDL guidance because this stream segment will require development of a TMDL in the very near future.

4. The report should address "passing" organisms as well as drifting ones. This is a minor point and it may be that they are not of concern due to the small stream above the embayment but the subject should be addressed as free swimming organisms may spend more time in the embayment than would planktonic ones. Particularly if they spawn there.

5. In my opinion, the comparison between effluent data and

STORET data is essentially meaningless. The data were obtained at different locations and most of the data were obtained on different days. No attempt was made (probably cannot be made) to link cause and effect between the two data sets. The only use of such data that occurs to me is a simple statistical test to demonstrate that the data are from different populations.

Further, the calculation and reporting of numerical reduction factors based on such data is potentially extremely misleading and should be eliminated from the report.

6. Figure 2, on the other hand, is extremely informative and I would suggest that it be moved into section 3.2.

Memorandum

Department of Environmental Quality
Northern Virginia Regional Office

13901 Crown Court Woodbridge, Virginia 22193 703/583-3800

To: Dale Phillips

cc: A. Laubscher
L. Collier
A. Young

From: Tom Faha

Date: August 20, 1997

Subject: Mixing Zone Analyses for Lower Potomac STP and Alexandria STP

Greeley and Hansen has prepared chronic dilution analyses for the Alexandria and Lower Potomac STPs. You have already reviewed and commented on the Alexandria analysis. The Lower Potomac analysis is enclosed and we ask for your review and comment on it.

It is our consensus that the mixing zones and complete mix assumptions proposed by Greeley and Hansen are not appropriate for either receiving stream, Hunting Creek for Alexandria, or Pohick Creek for Lower Potomac. Although the proposals, with further documentation, may meet the exposure criteria set forth in Guidance Memo 93-015 Amendment No. 1 for passing and drifting organisms, we believe that they would violate the Use Designation standard (9 VAC 25-260-10) and the General Standard (9 VAC 25-260-20). Both proposals would cause whole segments of the receiving streams to violate standards continuously and thereby risk the beneficial uses of these waters.

Again, please review and comment on the proposal for Lower Potomac as well as our assessment of the proposal(s).

Thank you.

CO /IONWEALTH OF VI INIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
Office of Permit Support

629 East Main Street Richmond, Virginia 23219

MEMORANDUM

Subject: Potomac Embayments and Mixing zones

To: Tom Faha, NRO

From: M. Dale Phillips, OPS

Date: August 27, 1997

Copies:

I too am concerned with the approach being used for the analysis of mixing zones in the Potomac embayments. We accepted an analysis using the VIMS models for Neabsco Creek based on several considerations only part of which was actually related to the model's predictions. Those considerations include:

- Neabsco Creek is relatively wide compared to its length.
- The location of the discharge is in the tidal portion of the Creek relatively near the mouth.
- The model indicated very rapid tidal flushing.
- Effluent flow is small compared to volume of the embayment.
- It was our opinion based on the above points that it was unlikely that the effluent would adversely impact either the entire width or the overall ecology of this particular system.

However, our acceptance of the Neabsco Creek proposal has apparently been interpreted by the other embayment dischargers and/or their representatives as a green light for wholesale application of complete mix models coupled with tidal flushing considerations for all the embayments regardless of the physical situation or other concerns that would make the approach unacceptable for reasons that have nothing to do with the model.

For embayments that are long, narrow and shallow, monitoring data, model predictions and experience indicate that the water quality is almost totally a function of the effluent quality. In these situations the entire body of the embayment will always have concentrations that exceed the standard. The exceedances are not episodic as allowed for by the standard.

The application of the approach to the Lower Potomac STP is perhaps the most extreme example. That discharge is actually to the free flowing portion of Pohick Creek, in fact, the discharge is essentially all of the flow in Pohick Creek for the last mile or so of the free flowing section. Once mixing in Pohick Creek is complete (probably a matter of yards) the standards apply. The rate of tidal flushing in Gunston Cove or the tidal part of Pohick Creek has no relationship whatsoever to a mixing zone at the discharge location.

As I indicated in review of the Alexandria dy and will again indicate for the Lower Potomac study, the concept is consistent with our general guidance relating to acceptance of complete mix assumptions based on exposure times in free flowing streams.

However, regardless of model accuracy or appropriateness, the guidance also advises the permit writer to abandon the guidance in those cases where they believe (based on their superior knowledge of the local situation) that it is not applicable (tidal waters, lakes, etc.) where resident organisms require protection or where the ecology of the system when considered as a whole will be adversely impacted.

I was somewhat remiss in not fully discussing these issues when we evaluated the Neabsco Creek proposal and apologize for any inconvenience that it has caused.

I agree with your assessment that these considerations render the concepts in our guidance not applicable to the Alexandria STP regardless of model predictions.

Relative to the Lower Potomac STP analysis, the modeling was performed properly but inappropriately applied because the discharge is to a free flowing stream. I cannot recommend acceptance of the analysis as a basis for establishing either the mixing zone or effluent limits for this facility. The mixing zone is located in the free flowing stream and consequently a mixing analysis is appropriate only for areas very near the discharge point. Based on the printouts that you sent, I believe that your application of the free flowing mixing guidance is appropriate. Tidal flushing or time of travel considerations are simply not applicable to the mixing of this effluent with its receiving stream.

I would be willing to reconsider the analysis if the discharge location were moved to a point near the mouth of Gunston Cove where the effluent may not completely dominate the water quality and ecology of the system.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

George Allen
Governor

Becky Norton Dunlop
Secretary of Natural Resources

Northern Virginia Regional Office
13901 Crown Court
Woodbridge, VA 22193
(703) 583-3800
Fax (703) 583-3801

Thomas L. Hopkins
Director

Gregory L. Clayton
Regional Director

September 9, 1997

Mr. James T. Canaday
Engineer-Director
Alaexandria Sanitation Authority
Post Office Box 1987
Alexandria, Virginia 22313

Re: VPDES Permit No. VA0025160 Alexandria Sanitation Authority
Mixing Zone Analysis

Dear Mr. Canaday:

Enclosed is DEQ's review of the *Hunting Creek Dilution Study*. As discussed in the review, we believe the results of the dilution study are not appropriate for the receiving stream.

If you have any questions concerning DEQ's review, please call me at (703) 583-3846.

Sincerely,

Thomas A. Faha
Water Permit Manager

Enclosure

ALEXANDRIA SANITATION AUTHORITY

835 SOUTH PAYNE STREET
P. O. BOX 1987
ALEXANDRIA, VIRGINIA 22313-1987

TEL. 703-549-3381

September 25, 1997

Mr. Thomas A. Faha
Water Permit Manager
Northern Virginia Regional Office
Department of Environmental Quality
13901 Crown Court
Woodbridge, VA 22193

Dear Mr. Faha:

I am in receipt of your letter to Mr. Canaday dated September 9, 1997, the attached memo to Dale Phillips from you dated August 20 and his return memo dated August 27. Also, I have received from Ms. Young, Dale Phillips' memo dated August 8. After reviewing these documents along with the *Hunting Creek Dilution Study* prepared by Greeley and Hansen, I can not concur with your conclusion that "the results of the dilution study are not appropriate for the receiving stream."

While I concur that you are not bound by guidance and may "abandon the guidance" when it is demonstrated to be inappropriate, you have not made any demonstration the dilution study is not appropriate to Hunting Creek. You state in your August 20 memo that "Both proposals would cause whole segments of the receiving streams to violate standards continuously..." You do not state which segments you believe would be in continuous violation or on what basis you make that determination.

Mr. Phillips' response memo of August 27, addresses the dilution study performed for Gunston Cove. He states that "the modeling was performed properly but inappropriately applied because the discharge is to a free flowing stream." No technical analysis is made of the *Hunting Creek Dilution Study* in this memo. Clearly, our discharge is to the tidal portion of Hunting Creek and therefore our situation must be analyzed separately from the Lower Potomac study.

I believe Mr. Phillips' August 8 memo is the appropriate starting point for further discussions in that it actually addresses the situation in Hunting Creek. In his first paragraph, he states that "The general approach seems to be consistent with our approach to controlling toxics..." In his second paragraph, he states that "The models used seem to be appropriate..." He goes on to raise some valid technical questions. We are quite willing to address these points and apply the best possible science to determine the correct resolution of these issues.

Mr. Phillips' final paragraph states that, "Figure 2,...,"is extremely informative and I would suggest it be moved into section 3.2" That figure indicates the extreme influence of tidal action on the entire Hunting Creek system from the Potomac River to Segment 11. It is not at all clear to me which segment you believe to "violate standards continuously."

One final note, Mr. Phillips states that "In my opinion, the comparison between effluent data and STORET data is essentially meaningless." That comparison was requested by your staff. The Authority, through it's paid consultants, spent considerable effort making the requested analysis.

In summary, I believe the results of the dilution study are appropriate to the receiving stream. While there are minor technical issues to be clarified, you have not justified rejecting the results. Mr. Phillips' first memo substantially supports our position. Your rejection seems more based on the situation at Lower Potomac than at Alexandria. Each embayment study must be evaluated on its own merits.

Thank you for your time and attention. We look forward to resolving the issues raised by Mr. Phillips in his August 8 memo.

Sincerely,

Glenn B. Harvey
Deputy Engineer-Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

George Allen
Governor

Becky Norton Dunlop
Secretary of Natural Resources

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Thomas L. Hopkins
Director

Gregory L. Clayton
Regional Director

October 20, 1997

Mr. Glenn B. Harvey
Deputy Engineer-Director
Alexandria Sanitation Authority
835 South Payne Street
P.O. Box 1987
Alexandria, Virginia 22313-1987

Dear Glenn:

This letter is a response to your September 25, 1997, letter to me regarding the dilution and mixing zone study being conducted by Alexandria Sanitation Authority (ASA). I apologize for the delay in this response but other matters concerning ASA have taken precedent.

The brevity of my September 9, 1997, letter to ASA was based on our belief that the enclosed memos explained our position for Hunting Creek and Pohick Creek.. It is our opinion that the Pohick Creek study was the more extreme of the two studies but our concerns with the Hunting Creek study are discussed in the memos as well.

We believe the complete mix assumptions used with exposure periods as outlined in the study present a reasonable threat to the Use Designation Standard and the General Standard for those Hunting Creek segments closest to the outfall. As outlined in the August 27, 1997, memo, staff has concerns about using complete mix assumptions for large discharges like ASA that discharge into comparatively small waterbodies. The result is a whole discernable segment of the waterbody being predominantly effluent. If the effluent does not meet chronic standards then the waterbody segment will not meet the requirements of the above standards. The further application of exposure periods for calculation of chronic limits, per DEQ's mixing zone guidance for the protection of passing and drifting organisms, would only extend the size of the non-attainment segment(s). The use of downstream dilution factors would result in the upstream segments being in continual violation of chronic standards.

Your letter states your intention to proceed with the study by addressing the comments in staff's August 8, 1997, memo. The decision to proceed with the study is entirely ASA's and we will review all submittals. However, we recommend that you consider and address the above comments before addressing the items in the August 8 memo. Please call me at 703/583-3846 with any questions you may have.

Respectfully,

Thomas A. Faha
Water Permits Manager

cc: A. Young

ALEXANDRIA SANITATION AUTHORITY

835 SOUTH PAYNE STREET
P. O. BOX 1987
ALEXANDRIA, VIRGINIA 22313-1987

TEL. 703-549-3381

March 19, 1998

Ms. April Young
Department of Environmental Quality
Northern Regional Office
13901 Crown Ct.
Woodbridge, VA 22193

Dear Ms. Young:

Enclosed are several documents relating to studies conducted for the Alexandria Sanitation Authority regarding appropriate permit Dissolved Oxygen (D.O.) values and development of dilution rates from the VIMS Tidal Prism Model (TPM). The documents include:

* Memo dated 2/4/98 from Mike Sullivan, Limno-Tech, Inc., "Documentation of TPM Application for Hunting Creek Dilution Analysis"

* Letter dated 1/28/98 from Mark Kennedy, Greeley and Hansen, "Tidal Prism Model Assesment of Instream Dissoved Oxygen in Hunting Creek Embayment"

* Memo dated 1/21/98 from Mike Sullivan, Limno-Tech, Inc., "Documentation and Results for Hunting Creek Disolved Oxygen Analysis"

* Report dated June 1997, Greeley and Hansen, "Technical Memorandum Hunting Creek Dilution Study for the Alexandria Sanitation Authority Wastewater Treatment Plant" (originally submitted June 18, 1997)

* Excerpts from report dated December 1987, Council of Governments, "A Dissolved Oxygen Study of the Upper Potomac

Memorandum

TO: Mark Kennedy, Greeley and Hansen **DATE:** 02/04/98
PROJECT: ALX4

FROM: Mike Sullivan, Limno-Tech, Inc.

SUBJECT: Documentation of TPM Application for Hunting Creek Dilution Analysis

We completed a modeling analysis of dilution in Hunting Creek Embayment during 1997. The analysis focused on quantifying the amount of dilution available in Hunting Creek in the vicinity of the ASA WWTP discharge under design flow conditions. The analysis was conducted through application of the Tidal Prism Model (TPM) developed by VIMS (Diana et al, 1987). The results of the dilution analysis were transmitted to you in a Fax/Memo with accompanying tabular summaries dated March 31, 1997. The intent of this memorandum is to document how the model was applied to quantify dilution.

Technical Approach

The technical approach used to quantify dilution is as follows:

- CBOD, a state variable in TPM, was simulated as a conservative substance to track dilution in Hunting Creek. Other systems simulated by TPM were essentially not relevant and were ignored

- A fixed amount of CBOD was established as a constant model input for the ASA WWTP. This was 4,510 lbs of CBOD/day, assuming a discharge of 54 MGD, and an effluent concentration of 10 mg/l of CBOD.

- No other sources of CBOD were included in the analysis (e.g., the upstream input was set to zero).

- No CBOD loss mechanisms were implemented (e.g., the settling rate of CBOD was set to zero, the CBOD decay coefficient was set to zero).

- Design flow conditions for summer (7Q10 = 2.5 cfs) and winter (7Q10 = 5.2 cfs) were implemented, and the TPM was run for 30 tidal cycles to reach a steady state condition.

- The instream concentrations for CBOD predicted by the TPM provided the basis for calculating dilution as the WWTP is the only source, with no sinks or losses. Dilution was calculated for each model segment. TPM predicts the CBOD concentration at high tide. A VIMS recommended procedure is used to estimate the concentration at low tide. Average dilution is based upon the arithmetic average of high and low tide values.

```
    30    2    0    0    6
    29   30
  Hunting Creek: TPM Dilution Analysis March 1997
   11   0
    1   11    main channel
 0.00       0.33      0.50      0.76      0.95      1.14      1.33
 1.52       1.70      1.89      2.75
 0.00       27.61     10.68     3.20      0.90      0.81      0.69
 0.56       0.49      0.32      1.95
 28.97      11.59     4.96      2.98      2.44      1.91      1.40
 0.94       0.52      0.24      0.00
 0.00       0.00      0.60      0.00      0.00      0.00      0.00
 0.00       0.00      0.00      0.00
 3.10       4.50      7.10      3.20      2.90      2.40      2.00
 1.70       1.40      1.20      0.50
    99.
 Dilution Analysis - Physical Data Sets
 1  main channel
    1    1    WATER TEMPERATURE
 28.8
    2   11    INITIAL CONDITIONS
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
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 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
    3    1    POINTSOURCE WASTEWATER
    6           83.6      0.        0.        0.        0.
                    0.        0.    4510.       0.        0.
    4    1    NON-POINT SOURCES
  11   2.50       0.        0.        0.        0.        0.        0.        0.
    5   11    BENTHIC OXYGEN DEMAND (SOD)
 1.065
 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
    6   11    TURBIDITY (LIGHT EXTINCTION)
 3.50 4.00 5.10 5.90 5.90 6.00 6.00 6.10 6.10 6.20 6.30
    7   11    CBOD DECAY COEFFICIENT
 1.047
 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
    8    1    DOWNSTREAM BOUNDARY CONDITIONS
 00.0
         0.        0.        0.
         0.        0.
         0.
         0.        0.
         0.
  99
 999
 1.0        1.0       1.0       1.0
 1.0        1.0       1.0
 0.0        0.0
 1.0        1.0       1.0       1.0       1.0       1.0       1.0
 1.0        1.0       1.0       1.0       1.0
 1.0
 1.0
```

GREELEY AND HANSEN
ENGINEERS
8905 PRESIDENTIAL PARKWAY • SUITE 230 • UPPER MARLBORO, MD 20772
(301) 817-3700 • FAX (301) 817-3735

January 28, 1997

Mr. Glenn Harvey
Alexandria Sanitation Authority
835 S. Payne Street
P.O. Box 1987
Alexandria, VA 22313

Subject: Tidal Prism Model Assessment of Instream Dissolved Oxygen in Hunting Creek Embayment

Dear Mr. Harvey:

This letter is to transmit to you the results of the subject modeling and recommendations for permit limits for the Alexandria Sanitation Authority (ASA) Wastewater Treatment Plant (WWTP). As you know, the Northern Virginia Planning District Commission (NVPDC) completed the Potomac Embayments Wasteload Allocation Study[1] to determine what effluent limits were necessary for the several WWTPs which discharge treated effluent into the waters of the Upper Potomac Estuary.

The recommended effluent limits for the ASA WWTP based on instream dissolved oxygen and eutrophication (as measured by chlorophyll-a) were as follows:

Seasonal Condition	Plant Flow	Recommended Effluent Concentrations (mg/L)			
		DO	$CBOD_5$	TKN	TP
Summer	54 MGD	7.6	3.0	20*	1.0
		----- OR -----			
		7.6	10	1.0	1.0
Winter	54 MGD	6.0	10	20*	1.0
* Indicates no nitrification needed.					

[1]NVPDC, "Potomac Embayments Wasteload Allocation Study," Vol. III, June 30, 1988.

data, well above the 90th percentile typically used in permitting assessments. The TPM results show that instream DO standards are met at any effluent DO ranging from 6.0 to 7.6 mg/L.

Sediment oxygen demand is a measure of the instream oxygen depletion due to biochemical activity in the stream sediments. SOD levels from both the 1988 report and expected SOD levels based on best professional judgement were used in this TPM rerun and the resulting effects on instream DO compared. The results indicate a dramatic affect due to the SOD levels in TPM segments 4, 5 and 6. We believe that the relatively high SOD values in these segments have diminished over the past 15 years or so and that a lower estimate is warranted unless new data suggests otherwise. However, even with the higher 1980's SOD values, instream DO standards are met at 27.5°C. If new oxygen depleting discharges are proposed for Hunting Creek, the SOD should be re-evaluated as part of a TMDL assessment in order to more accurately determine appropriate permit limits. In the absence of any new discharges, however, a re-evaluation of the SOD in Hunting Creek should not be necessary.

In conclusion, the TPM results indicate that the following effluent limits are more than adequate to protect instream DO and eutrophication (as measured by chlorophyll-a):

Recommended Annual Permit Limits	
Parameter	Monthly Average (mg/L)
$CBOD_5$	5.0*
TSS	6.0*
TP	0.18*
NH_3 (Summer Only)	1.0*
DO	6.0

*Required by the Policy for the Potomac River Embayments.

Please do not hesitate to call with questions.

Yours very truly,

GREELEY AND HANSEN

Mark T. Kennedy

MTK/tlh
Attachments

H:\ADMIN\1853\300.01\HARVEY4.LTR

Nonpoint Sources: Includes summer 7Q10 of 2.5 cfs for Hunting Creek, and headwater constituent concentrations from the WLA Study.

Benthic Oxygen Demand: Taken from WLA Study and TPM Manual (page 29).

Turbidity (Light Extinction): Taken from the WLA Study and TPM Manual (page 29).

CBOD Decay: Taken from the WLA Study and TPM Manual (page 29).

Downstream Boundary Conditions: Taken from WLA Study, Alternative A2.

Biological Parameters: Taken from TPM Manual.

Presentation and Discussion of Model Results

The TPM predicts concentrations for water quality constituents at high tide for each model segment. The condition at low tide within each segment is approximated by translating the upstream segment concentration downstream one segment. Average concentration per segment over a tidal cycle is calculated as the arithmetic mean or average of these two values.

Four separate sets of DO results are presented in graphical and tabular form. A brief description of each is as follows:

Conditions in Set 1 have water temperature at 25 C with ASA DO effluent varying from 6.0 to 7.6 mg/l. Average conditions are substantially above the water quality standard of 5.0 mg/l in all segments under these scenarios, and differences attributed to varying the ASA effluent DO concentration are negligible.

Conditions in Set 2 have water temperature at 27.5 C with ASA DO effluent varying from 6.0 to 7.6 mg/l. Average conditions are above the water quality standard of 5.0 mg/l in all segments under these scenarios, and differences attributed to varying the ASA effluent DO concentration are negligible.

Conditions in Set 3 have water temperature increased to 29 C with ASA DO effluent varying from 6.0 to 7.6 mg/l. While average conditions remain above the water quality standard of 5.0 mg/l in all segments under these scenarios, excursions below the standard also occur. Again, differences attributable to varying the ASA effluent DO concentration are negligible.

Conditions in Set 4 have water temperature at 29 C, ASA DO effluent varying from 6.0 to 7.6 mg/l, and SOD reduced from 4.0 to 2.0 $gm/m^2/day$ in segments 4, 5 and 6. As indicated, this change pulls the DO up substantially, even with temperature at 29 C.

Distance from Mouth (miles)	25 C 6.0 mg/l high tide	25 C 6.0 mg/l low tide	25 C 6.0 mg/l average
0.17	7.36	6.76	7.06
0.42	6.76	5.84	6.30
0.63	5.84	6.33	6.09
0.86	6.33	6.00	6.16
1.05	6.00	7.09	6.54
1.24	7.09	7.23	7.16
1.43	7.23	7.21	7.22
1.61	7.21	7.92	7.56
1.80	7.92	7.96	7.94
2.32	7.96	9.20	8.58

Distance from Mouth (miles)	25 C 6.5 mg/l high tide	25 C 6.5 mg/l low tide	25 C 6.5 mg/l average
0.17	7.38	6.84	7.11
0.42	6.84	5.86	6.35
0.63	5.86	6.34	6.10
0.86	6.34	6.06	6.20
1.05	6.06	7.12	6.59
1.24	7.12	7.25	7.19
1.43	7.25	7.23	7.24
1.61	7.23	7.92	7.58
1.80	7.92	7.96	7.94
2.32	7.96	9.20	8.58

Distance from Mouth (miles)	25 C 7.0 mg/l high tide	25 C 7.0 mg/l low tide	25 C 7.0 mg/l average
0.17	7.39	6.92	7.15
0.42	6.92	5.88	6.40
0.63	5.88	6.35	6.11
0.86	6.35	6.12	6.23
1.05	6.12	7.16	6.64
1.24	7.16	7.27	7.21
1.43	7.27	7.24	7.26
1.61	7.24	7.93	7.59
1.80	7.93	7.96	7.94
2.32	7.96	9.20	8.58

Distance from Mouth (miles)	25 C 7.6 mg/l high tide	25 C 7.6 mg/l low tide	25 C 7.6 mg/l average
0.17	7.40	7.02	7.21
0.42	7.02	5.90	6.46
0.63	5.90	6.36	6.13
0.86	6.36	6.19	6.28
1.05	6.19	7.20	6.70
1.24	7.20	7.29	7.25
1.43	7.29	7.26	7.28
1.61	7.26	7.94	7.60
1.80	7.94	7.96	7.95
2.32	7.96	9.20	8.58

Distance from Mouth (miles)	27.5 C 6.0 mg/l high tide	27.5 C 6.0 mg/l low tide	27.5 C 6.0 mg/l average
0.17	7.07	6.54	6.80
0.42	6.54	5.20	5.87
0.63	5.20	5.75	5.47
0.86	5.75	5.48	5.61
1.05	5.48	6.66	6.07
1.24	6.66	6.78	6.72
1.43	6.78	6.75	6.77
1.61	6.75	7.51	7.13
1.80	7.51	7.54	7.52
2.32	7.54	9.20	8.37

Distance from Mouth (miles)	27.5 C 6.5 mg/l high tide	27.5 C 6.5 mg/l low tide	27.5 C 6.5 mg/l average
0.17	7.08	6.62	6.85
0.42	6.62	5.22	5.92
0.63	5.22	5.75	5.49
0.86	5.75	5.53	5.64
1.05	5.53	6.69	6.11
1.24	6.69	6.80	6.74
1.43	6.80	6.76	6.78
1.61	6.76	7.52	7.14
1.80	7.52	7.54	7.53
2.32	7.54	9.20	8.37

Distance from Mouth (miles)	27.5 C 7.0 mg/l high tide	27.5 C 7.0 mg/l low tide	27.5 C 7.0 mg/l average
0.17	7.09	6.70	6.89
0.42	6.70	5.23	5.96
0.63	5.23	5.76	5.50
0.86	5.76	5.59	5.67
1.05	5.59	6.72	6.15
1.24	6.72	6.82	6.77
1.43	6.82	6.77	6.79
1.61	6.77	7.52	7.14
1.80	7.52	7.54	7.53
2.32	7.54	9.20	8.37

Distance from Mouth (miles)	27.5 C 7.6 mg/l high tide	27.5 C 7.6 mg/l low tide	27.5 C 7.6 mg/l average
0.17	7.10	6.79	6.95
0.42	6.79	5.25	6.02
0.63	5.25	5.77	5.51
0.86	5.77	5.65	5.71
1.05	5.65	6.76	6.21
1.24	6.76	6.84	6.80
1.43	6.84	6.78	6.81
1.61	6.78	7.53	7.16
1.80	7.53	7.54	7.53
2.32	7.54	9.20	8.37

Distance from Mouth (miles)	29 C 6.0 mg/l high tide	29 C 6.0 mg/l low tide	29 C 6.0 mg/l average
0.17	6.89	6.40	6.65
0.42	6.40	4.82	5.61
0.63	4.82	5.41	5.12
0.86	5.41	5.17	5.29
1.05	5.17	6.42	5.80
1.24	6.42	6.54	6.48
1.43	6.54	6.49	6.51
1.61	6.49	7.29	6.89
1.80	7.29	7.31	7.30
2.32	7.31	9.20	8.26

Distance from Mouth (miles)	29 C 6.5 mg/l high tide	29 C 6.5 mg/l low tide	29 C 6.5 mg/l average
0.17	6.90	6.48	6.69
0.42	6.48	4.84	5.66
0.63	4.84	5.42	5.13
0.86	5.42	5.23	5.32
1.05	5.23	6.45	5.84
1.24	6.45	6.55	6.50
1.43	6.55	6.50	6.53
1.61	6.50	7.30	6.90
1.80	7.30	7.31	7.31
2.32	7.31	9.20	8.26

Distance from Mouth (miles)	29 C 7.0 mg/l high tide	29 C 7.0 mg/l low tide	29 C 7.0 mg/l average
0.17	6.91	6.56	6.73
0.42	6.56	4.85	5.70
0.63	4.85	5.42	5.14
0.86	5.42	5.28	5.35
1.05	5.28	6.48	5.88
1.24	6.48	6.57	6.52
1.43	6.57	6.51	6.54
1.61	6.51	7.31	6.91
1.80	7.31	7.31	7.31
2.32	7.31	9.20	8.26

Distance from Mouth (miles)	29 C 7.6 mg/l high tide	29 C 7.6 mg/l low tide	29 C 7.6 mg/l average
0.17	6.92	6.65	6.79
0.42	6.65	4.87	5.76
0.63	4.87	5.43	5.15
0.86	5.43	5.34	5.38
1.05	5.34	6.51	5.92
1.24	6.51	6.59	6.55
1.43	6.59	6.52	6.55
1.61	6.52	7.31	6.92
1.80	7.31	7.31	7.31
2.32	7.31	9.20	8.26

(SOD<2.0 max) Distance from Mouth (miles)	29 C 6.0 mg/l high tide	29 C 6.0 mg/l low tide	29 C 6.0 mg/l average
0.17	6.97	6.47	6.72
0.42	6.47	6.24	6.36
0.63	6.24	6.55	6.39
0.86	6.55	6.28	6.42
1.05	6.28	6.43	6.35
1.24	6.43	6.54	6.48
1.43	6.54	6.49	6.52
1.61	6.49	7.30	6.89
1.80	7.30	7.31	7.30
2.32	7.31	7.10	7.21

(SOD<2.0 max) Distance from Mouth (miles)	29 C 6.5 mg/l high tide	29 C 6.5 mg/l low tide	29 C 6.5 mg/l average
0.17	6.98	6.55	6.76
0.42	6.55	6.25	6.40
0.63	6.25	6.56	6.40
0.86	6.56	6.33	6.45
1.05	6.33	6.45	6.39
1.24	6.45	6.56	6.51
1.43	6.56	6.50	6.53
1.61	6.50	7.30	6.90
1.80	7.30	7.31	7.31
2.32	7.31	7.10	7.21

(SOD<2.0 max) Distance from Mouth (miles)	29 C 7.0 mg/l high tide	29 C 7.0 mg/l low tide	29 C 7.0 mg/l average
0.17	6.99	6.63	6.81
0.42	6.63	6.27	6.45
0.63	6.27	6.56	6.42
0.86	6.56	6.39	6.47
1.05	6.39	6.48	6.43
1.24	6.48	6.57	6.53
1.43	6.57	6.51	6.54
1.61	6.51	7.31	6.91
1.80	7.31	7.31	7.31
2.32	7.31	7.10	7.21

(SOD<2.0 max) Distance from Mouth (miles)	29 C 7.6 mg/l high tide	29 C 7.6 mg/l low tide	29 C 7.6 mg/l average
0.17	7.00	6.72	6.86
0.42	6.72	6.29	6.50
0.63	6.29	6.57	6.43
0.86	6.57	6.45	6.51
1.05	6.45	6.52	6.48
1.24	6.52	6.59	6.55
1.43	6.59	6.52	6.56
1.61	6.52	7.31	6.92
1.80	7.31	7.31	7.31
2.32	7.31	7.10	7.21

Tidal Prism Model Inputs

```
70.
1.0         7.4
100.0
 99
999
0.2         0.005       .002        3.
0.2         .005        0.0
0.2          26.
.025        .005        .0005       .025        .005        .09         250.
632.        .005        0.2         1.00         1.00
0.6
.05
2.
```

TIDAL PRISM MODEL MANUAL

by
Barbara Diana, Albert Y. Kuo,
Bruce J. Neilson, Carl F. Cerco and Paul V. Hyer

Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

January 1987

ALEXANDRIA SANITATION AUTHORITY

Technical Memorandum
Hunting Creek Dilution Study for the Alexandria Sanitation Authority Wastewater Treatment Plant

Greeley and Hansen
June 1997

The volume of water within the embayment at high tide is approximately 46 million cubic feet, and the average depth is 4.6 feet (Diana et al., 1987). The freshwater inflow to the embayment is variable and linked directly to local rainfall. However, the majority of the water contribution to the embayment is tidal flow from the Potomac River. This can be seen from a disaggregation of embayment volumes as follows:

Tidal Cycle-based Water Volumes in Hunting Creek Embayment

Source of Water Contribution	Summer (April-October)	Winter (November-March)
Cameron Run (7Q10)[1]	112,500 cf (2.5 cfs)	234,000 cf (5.2 cfs)
ASA WWTP (Permitted Flow)	3,750,000 cf (54 MGD, 83.5 cfs)	3,760,000 cf (54 MGD, 83.5 cfs)
Tidal Flushing [2]	29,000,000 cf	29,000,000 cf
Total volume at low tide	16,750,000 cf	16,750,000 cf
Total volume at high tide	45,750,000 cf	45,750,000 cf

Note (1) From Herman, 1996.

(2) From Diana, et al., 1987. 29 million cubic feet per day nearly twice each day (tide cycle).

The large differences in volumes shown above indicate that the embayment is significantly influenced by tides.

The mouth of the embayment at its confluence with the Potomac River is broad and resembles a delta. Two channels drain out along the shoreline, one to the north and one to the south. The center of the embayment is a large expansive mud flat during low tide. Thick beds of Hydrilla and other submerged aquatic vegetation have occupied much of this outer embayment since 1984. As a Class II Estuarine Water (VR 680-21-01.5), the general water quality standards established by the Commonwealth of Virginia are intended to protect the embayment for recreational use and for the propagation and growth of a balanced population of fish and wildlife.

2.2 Description of the Virginia Institute of Marine Sciences (VIMS) Tidal Prism Model (TPM) for Hunting Creek Embayment

The Virginia Institute of Marine Science's (VIMS) Tidal Prism Model (TPM) was developed by VIMS and used to model water quality impacts in Hunting Creek Embayment. TPM development was supported by extensive field investigations, laboratory research, and model calibration and verification. TPM is endorsed by the Virginia Department of Environmental Quality as the preferred water quality modeling tool for the embayment.

The method to calculate the average effluent exposure of a drifting organism is to multiply the dilution factor in each segment by the time the organism is resident in that segment. The products of segment dilutions and exposure times are then added and the sum is divided by the cumulative exposure time for the organism -- held to four days for the purpose of chronic toxicity evaluations. Segment dilutions were determined using TPM. Drifting organism residence times in each segment were determined using DYNHYD.

3.1 TPM Results

TPM was run using upstream 7Q10 flows of 2.5 and 5.2 cfs (for summer and winter, respectively) and the ASA WWTP design flow of 54 MGD (83.5 cfs). The dilutions in each model segment in terms of percent effluent (or IWC) for these design conditions are as follows:

Dilution Rates from the VIMS Tidal Prism Model
for Hunting Creek Embayment
(Values as percent effluent or instream waste concentrations - IWC)

Model Segment	Summer 7Q10=2.5 cfs	Winter 7Q10=5.2 cfs
11 (upstream)	47.6%	23.8%
10	62.5%	47.6%
9	76.9%	71.4%
8	83.3%	76.9%
7	83.3%	83.3%
6	90.9%	83.3%
5	76.9%	71.4%
4	58.8%	55.6%
3	41.7%	41.7%
2 (downstream)	18.9%	18.9%

As expected, the dilution rates are greater in the winter months than in the summer months (i.e. the IWCs are smaller) in the upstream segments because of the greater winter 7Q10 flow. Tidal flushing controls dilution more significantly in the downstream segments, with segments 3 and 2 showing no seasonal differences in dilution under 7Q10 conditions.

Drifting Organism Exposure Results: Winter		
Upstream Starting Segment	Downstream Ending Segment	Cumulative Exposure (% effluent)
11	2	55.5% (worst case)
10	2	50.4%
9	2	49.6%
8	2	45.0%
7	2	43.7%
6	2	37.1%
5	Out of system [1]	33.4%
4	Out of system	31.4%
3	Out of system	27.2%
2	Out of system	22.1%

Notes (1) "Out of system" refers to a particle which would be flushed completely out of Hunting Creek Embayment into the main stem of the Potomac River.

The results show that the worst case (i.e. highest exposure) scenarios are for a drifting organism starting at model segments 9 (in the summer) and 11 (in the winter) which result in cumulative effluent exposure concentrations of 63.7% and 55.5% respectively. Several additional conclusions may be made as follows:

a. Drifting organisms will travel back and forth between the model segments according to tidal cycle.

b. It may take several tidal cycles to flush drifting organisms out of Hunting Creek Embayment into the Potomac River, depending on the starting point.

c. Drifting organisms beginning in segments 2 through 8 (the WWTP outfall is in segment 6) are flushed either into the Potomac River or segment 2, the outermost model segment adjacent to the Potomac River, in less than four days under summer critical flow conditions.

d. All drifting organisms in Hunting Creek are flushed either into the Potomac River or segment 2, the outermost model segment adjacent to the Potomac River, in less than four days under winter critical flow conditions.

is very low (say <0.5 mg/L) this is probably due to Potomac River inflow during an incoming tide. (It could also be due to stormwater flow if the STORET datum were taken during or just after a rainstorm). On average, however, one would expect to see a correlation between WWTP and GW Memorial Parkway Bridge ammonia data. Weekly WWTP effluent ammonia data and 57 monthly GW Memorial Parkway Bridge STORET ammonia data are shown in Table 1 (3 pages). These data, arranged side-by-side, show a general reduction in instream ammonia concentration, allowing for exceptional tide or weather events. The average ammonia reduction shown on Table 1 is 46% which confirms the presence of instream dilution and/or ammonia decay. Ammonia decay was not incorporated into this dilution study.

4.3 Hooffs Run WWTP Outfall

The outfall on Hooffs Run is in the same TPM model segment as outfall 001, therefore, model results for this outfall will be identical to the results for 001. This outfall is not used but may be placed in service during future construction activities.

5.0 REFERENCES

Diana, B., et al, "Tidal Prism Model," Virginia Institute of Marine Science, Gloucester Point, VA (1987).

Herman, Paul, "Flow Frequency Determination: Alexandria STP", Memorandum to April Young, Virginia Department of Environmental Quality, Richmond, VA, December 31, 1996.

U.S. Environmental Protection Agency (USEPA), "User's Manual for the Dynamic (Potomac) Estuary Model," NTIS PB-296-141, Annapolis, MD (1979).

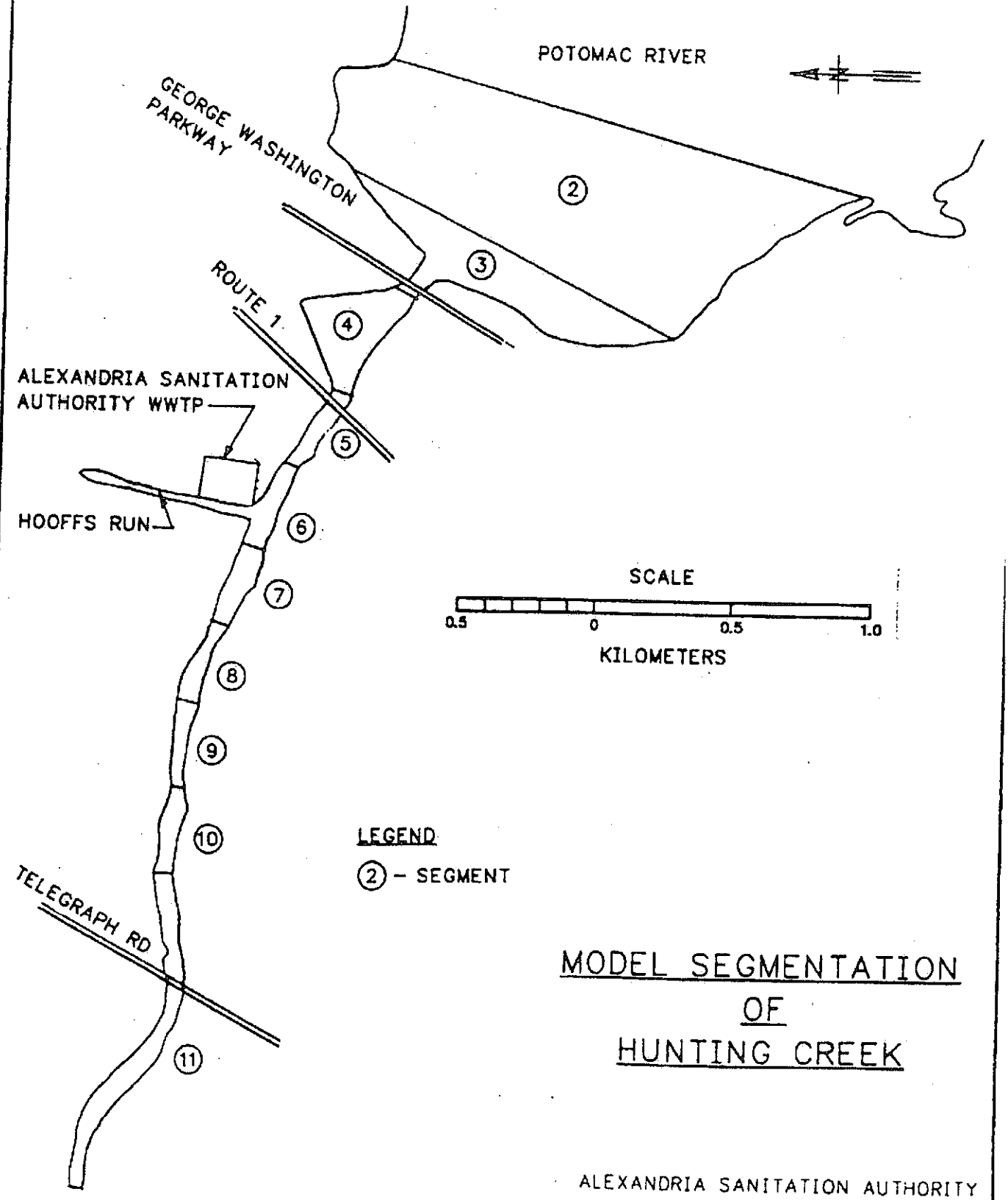
Virginia State Water Control Board, "Water Quality Standards", VR 680-21-00, Richmond, VA, May 20, 1992.

Water Resources Engineers (WRE), "A Water Quality Model of the Sacramento-San Joaquin Delta," Report to the U.S. Public Health Service, Region IX (1965).

TABLE 1
COMPARISON OF AMMONIA DATA FROM
ASA WWTP EFFLUENT AND THE STORET DATABASE
AT THE GEORGE WASHINGTON BRIDGE

DATE	Effluent Data NH3-N mg/L	STORET NH3 VALUES mg/L	Percent Reduction %
11-May-93		10.1	
12-May-93	16.8		39.9%
15-Jun-93		12.4	
16-Jun-93	20.2		38.6%
13-Jul-93		13.3	
14-Jul-93	17.5		24.0%
10-Aug-93		11.6	
11-Aug-93	19.0		38.9%
14-Sep-93		12.2	
15-Sep-93	22.4		45.5%
06-Oct-93	22.4		
07-Oct-93		9.8	56.2%
17-Nov-93	26.0	9	65.4%
07-Dec-93	13.2	4.1	68.9%
09-Feb-94	14.7	3.89	73.5%
02-Mar-94	12.9		
08-Mar-94		3.95	
10-Mar-94	9.4		64.7%
19-Apr-94		9	
20-Apr-94	16.8		46.4%
25-May-94	16.9	13.27	21.5%
14-Jun-94		4.65	
15-Jun-94	20.3		77.1%
16-Aug-94		11.1	
17-Aug-94	13.4		17.2%
13-Sep-94	26.0	19.6	24.6%
25-Oct-94		6.3	
26-Oct-94	22.4		71.9%
16-Nov-94	26.3	19.4	26.2%
13-Dec-94		14.24	
14-Dec-94	23.0		38.1%
18-Jan-95	20.8	0.63	97.0%
07-Feb-95	11.8	16.75	-41.9%

FIGURE 1



MODEL SEGMENTATION OF HUNTING CREEK

GREELEY AND HANSEN

ALEXANDRIA SANITATION AUTHORITY
HUNTING CREEK DILUTION STUDY
FINAL REPORT
JUNE, 1997

FILE: PHLIST SCALE: 1:1 02/19/1997 at 10:46 - #13_c4#

metropolitan washington
COUNCIL OF GOVERNMENTS
1875 Eye Street, N.W., Suite 200, Washington, D.C. 20006-5454
(202) 223-6800 TDD 223-5980

A DISSOLVED OXYGEN STUDY OF THE UPPER POTOMAC ESTUARY

FINAL REPORT

EXECUTIVE SUMMARY

Prepared By

Wendy H. Chittenden and Stuart A. Freudberg

Department of Environmental Programs
Metropolitan Washington Council of Governments

On Behalf of the
Potomac Studies Policy Committee

December, 1987

10.3 ALTERNATIVE TREATMENT SCENARIOS

DEM simulations were made for the following scenarios. Again, all simulations were run under two different conditions: 1) extreme low flow conditions (Q7-10, 28°C); and 2) typical summer conditions characterized by a below median summer flow of 2500 cfs and a median summer temperature of 23°C.

10.3.1 Existing Treatment, Projected 2005 Flows

These simulations assumed wastewater effluent concentrations at the BPFS recommended levels in the year 2005, with 2005 design flows at the plants. Effluent concentrations used in the model are outlined in Table 10.2. These runs were used to produce baseline assessments of predicted minimum dissolved oxygen levels under the two different flow conditions to which all other alternatives were compared.

Table 10.2
Flows and Concentrations Assumed for the
Projected 2005 Alternatives

	FLOW (MGD)	BOD5 (mg/l)	NH3* (mg/l)	DO (mg/l)
Blue Plains	370	5.0	1.1	5.0
Arlington**	32	10.0	15.2	5.0
Alexandria	49	10.0	15.2	5.0

* NH3 plus 10% TON

** Simulations were also made assuming a 2005 Arlington flow of 40 MGD.

10.3.2 Nitrification at Arlington and Alexandria

These runs were used to simulate the nitrification requirement originally recommended by the regulatory agencies. They assumed flows and effluent concentrations identical to those outlined in Table 10.2 for all parameters except ammonia. As a result of nitrification, available ammonia at Arlington and Alexandria was reduced to 0.38 mg/l, consistent with a TKN of 1.99 mg/l.

10.3.3 Nitrification Alternatives at Blue Plains

Currently, the Blue Plains effluent limit for unoxidized nitrogen is 1.0 mg/l of ammonia. For DEM modeling purposes, it is assumed that this limit results in 1.1 mg/l of total available ammonia (available ammonia=ammonia+0.1 TON). An alternative discharge limit for regulating nitrification at that plant would be 1.99 mg/l of TKN. Under this scenario, the available ammonia concentration is assumed to be 0.38 mg/l (0.2 + (.10)(1.79)). (As discussed in Section 2, actual ammonia effluent concentrations at Blue Plains are usually much less than 1.0 mg/l). DEM was use to compare this alternative with the current 1.0 mg/l ammonia limit situation.

ATTACHMENT 14

Ammonia Limit Derivations

3/18/2014 11:13:13 AM

Facility = Alexandria Renew Enterprises
Chemical = Ammonia (Feb - Mar ELSP)
Chronic averaging period = 30
WLAa = 60
WLAc = 10.4
Q.L. = 0.2
# samples/mo. = 28
# samples/wk. = 7

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 20.9837689715296
Average Weekly limit = 12.8149389357327
Average Monthly LImit = 10.4623638398548

The data are:

9

3/18/2014 11:14:14 AM

Facility = Alexandria Renew Enterprises
Chemical = Ammonia (Apr - Oct ELSP)
Chronic averaging period = 30
WLAa = 60
WLAc = 4.8
Q.L. = 0.2
# samples/mo. = 28
# samples/wk. = 7

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 9.68481644839829
Average Weekly limit = 5.91458720110742
Average Monthly LImit = 4.8287833107022

The data are:

9

Facility = Alexandria WWTP
Chemical = Ammonia April-October
Chronic averaging period = 30
WLAa = 65.72
WLAc = 3.54
Q.L. = .2
# samples/mo. = 30
# samples/wk. = 7

Summary of Statistics:

observations = 1
Expected Value = 10
Variance = 36
C.V. = 0.6
97th percentile daily values = 24.3341
97th percentile 4 day average = 16.6379
97th percentile 30 day average= 12.0605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 7.14255213069374
Average Weekly limit = 4.36200806081672
Average Monthly Limit = 3.54

The data are:

10

3/18/2014 11:15:19 AM

Facility = Alexandria Renew Enterprises
Chemical = Ammonia (Nov - Jan ELSA)
Chronic averaging period = 30
WLAa = 60
WLAc = 10.4
Q.L. = 0.2
# samples/mo. = 28
# samples/wk. = 7

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 20.9837689715296
Average Weekly limit = 12.8149389357327
Average Monthly LImit = 10.4623638398548

The data are:

9

ATTACHMENT 15

Chlorine Limit Derivation
for
Outfall 002

7/10/2014 2:33:21 PM

Facility = Alexandria Renew Enterprises
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 0.038
WLAc = 0.044
Q.L. = 0.1
# samples/mo. = 112
# samples/wk. = 28

Summary of Statistics:

observations = 1
Expected Value = 20
Variance = 144
C.V. = 0.6
97th percentile daily values = 48.6683
97th percentile 4 day average = 33.2758
97th percentile 30 day average= 24.1210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.038
Average Weekly limit = 1.91922476864914E-02
Average Monthly LImit = 0.017281219211528

The data are:

20

ATTACHMENT 16

Copper and Zinc
Reasonable Potential Analyses

3/18/2014 10:48:48 AM

Facility = Alexandria Renew Enterprises
Chemical = Copper
Chronic averaging period = 4
WLAa = 32
WLAc = 20
Q.L. = 6.4
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 17
Expected Value = 7.78185
Variance = 21.8006
C.V. = 0.6
97th percentile daily values = 18.9365
97th percentile 4 day average = 12.9473
97th percentile 30 day average= 9.38533
< Q.L. = 8
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

12
10
5
3
5
4
10
7
6
15
14
14
21
7
3
5
3

3/18/2014 10:49:55 AM

Facility = Alexandria Renew Enterprises
Chemical = Zinc
Chronic averaging period = 4
WLAa = 280
WLAc = 260
Q.L. = 55
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 17
Expected Value = 38.6085
Variance = 536.623
C.V. = 0.6
97th percentile daily values = 93.9507
97th percentile 4 day average = 64.2365
97th percentile 30 day average= 46.5639
< Q.L. = 14
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

39
36
29
26
26
26
22
160
63
110
23
25
29
28
28
27
20

ATTACHMENT 17

Excerpt of 2013 Pretreatment Report

PART A

PRETREATMENT PERFORMANCE SUMMARY

I. General Information.

Control Authority Name:	Alexandria Renew Enterprises
Address:	1500 Eisenhower Ave.
City/State/Zip:	Alexandria, Virginia 22314
Contact Person:	Mary Ann Pietrowicz
Contact Telephone:	(703) 549-3381 Ext. 2016
NPDES Nos.:	VA 0025160
Reporting Period:	January 1 thru December 31, 2013
Total Categorical IUs:	0
Total Noncategorical SIU's:	3

II. SIU Compliance.	Industrial Users Categorical	Noncategorical
1. No. of CIUs submitting BMRs/no. required	0/0	NA
2. No. of CIUs Submitting 90-day compliance reports/no. required	0/0	NA
3. No. of SIUs submitting self-monitoring reports/no. required	0/0	3/3
4. No. of SIUs meeting Compliance schedule/no. required	0/0	0/0
5. No. of SIUs in significant noncompliance/total no. SIUs	0/0	0/3
6. Rate of significant noncompliance for all SIUs (Categorical and noncategorical)	0/0	0/3

III. Compliance Monitoring Program		
1. No. of Control Documents issued/no. required	0/0	3/3
2. No. of non sampling inspections conducted	0/0	3/3
3. No. of sampling visits conducted	0	5
4. No. of facilities inspected (non sampling)	0	3
5. No. of facilities sampled	0	3

IV. Enforcement Action		
1. Compliance schedules issued/no. required	0/0	0/0
2. Notice of violation issued to SIUs	0	1
3. Administrative orders issued to SIUs	0	0
4. Civil suits filed	0	0
5. Criminal suits filed	0	0
6. SIU's published for SNC (attach newspaper list)	0	0
7. Amount of penalties collected (total dollars/SIU assessed)	0	0
8. Other actions (sewer bans, etc.) Verbal/Written warnings	0	3

I certify that the information contained is complete and accurate to the best of my knowledge.

Karen Pallansch, CEO/Authorized Representative Signature

1.30.14
Date

PART A

Attachment A:

List of Significant Industrial Users with notation as to which are categorical, and the issuance and expiration dates for their permits.

User ID	Name and Address	Jurisdiction	Service Area	Category	SIC/NAICS
A102	Delta Electronics 5730 General Washington Drive Alexandria, VA 22312 J.B. Smith, Manager/Safety Coord. Phone: 703-354-3350	Fairfax County	Alexandria	40 CFR 433 (CIU) Metal Finishing	SIC: 3663, 3399, 3479 NAICS: 334220, 332813, 332812
A105	INOVA Fairfax Hospital 3300 Gallows Road Falls Church, VA 22042 David Marra, Assistant Director Email: david.marra@inova.org Phone: 703-776-3028	Fairfax County	Alexandria	Local limits SIU>25,000 gpd	SIC: 8062, 8071 NAICS: 622110, 621511, 621512
A106	Gannett Springfield Offset 6885 Commercial Drive Springfield, VA 22159 Jim Jones, General Manager Phone: 703-750-8648	Fairfax County	Alexandria	Local limits SIU>25,000 gpd	SIC: 2711, 2752 NAICS: 511110, 323111
A108	The Washington Post 7171 Wimsatt Road Springfield, VA 22151 Anthony Sylvain, Facilities Manager Email: sylvainaj@washpost.com Phone: 703-916-1931	Fairfax County	Alexandria	Local limits SIU>25,000 gpd	SIC: 2711, 2752 NAICS: 511110, 323111
001	Alsco, Inc 725 S. Pickett Street Alexandria VA 22304 Jon Ambler, General Manager Email: jambler@alsco.com Phone: 703-751-5785	Alexandria	Alexandria	Local limits SIU>25,000 gpd	SIC: 7218 NAICS: 812332
002	INOVA Alexandria Hospital 4320 Seminary Road Alexandria, VA 22304 Christine Candio, CEO Email: christine.candio@inova.org Phone: 703-504-3169	Alexandria	Alexandria	Local limits SIU>25,000 gpd	SIC: 8062, 8071 NAICS: 622110,621511, 621512
004	COVANTA Alexandria/Arlington 5301 Eisenhower Ave. Alexandria, VA 22304 Bryan Donnelly, Facility Manager Email: BDonnelly@CovantaEnergy.com Phone: 703-370-7722	Alexandria	Alexandria	Local limits SIU>25,000 gpd	SIC: 4953, 4911 NAICS: 562213, 221111

ATTACHMENT 18

Summary of Whole Effluent Test Results

BIOMONITORING RESULTS

Alexandria Sanitation Authority Advanced WWTP (VA0025160)

Table 1
Summary of Toxicity Test Results for Outfall 001

TEST DATE	TEST TYPE/ORGANISM	48-h LC_{50} (%)	IC_{25} (%)	NOEC	% SURV	TU_a	TU_c	LAB	REMARKS
4/15/99	Acute *C. dubia*	>100			95				1st quarterly
4/15/99	Acute *P. promelas*	**70.7**			0				
4/13/99	Chronic *C. dubia*			**22.8 SR**	0				
4/13/99	Chronic *P. promelas*			**22.8 SG**	60				
6/24/99	Acute *C. dubia*	>100			100				2nd quarterly
6/24/99	Acute *P. promelas*	>100			100				
6/22/99	Chronic *C. dubia*			100 S **22.8 R**	80				
6/22/99	Chronic *P. promelas*			100 S **45.5 G**	100				
TRE Notification September 28, 1999									
3/20/03	Acute *C. dubia*	>100			100	<1			1st confirmation
3/20/03	Acute *P. promelas*	>100			100	<1			
3/18/03	Chronic *C. dubia*	>100	98.6	100 S 91 R	100		1.1		
3/18/03	Chronic *P. promelas*	>100	>100	100 SG	100		1		
3/27/03	Acute *C. dubia*	>100			100	<1			2nd confirmation
3/27/03	Acute *P. promelas*	>100			100	<1			
3/25/03	Chronic *C. dubia*	>100	>100	100 SR	100		1		
3/25/03	Chronic *P. promelas*	>100	>100	100 SG	100		1		
4/3/03	Acute *C. dubia*	>100			100	<1			3rd confirmation
4/3/03	Acute *P. promelas*	>100			100	<1			
4/1/03	Chronic *C. dubia*	>100	>100	100 SR	100		1		
4/1//03	Chronic *P. promelas*	>100	>100	100 SG	98		1		
4/10/03	Acute *C. dubia*	>100			100	<1			4th confirmation
4/10/03	Acute *P. promelas*	>100			100	<1			
4/8/03	Chronic *C. dubia*	>100	>100	100 SR	100		1		
4/8//03	Chronic *P. promelas*	>100	>100	100 SG	98		1		
Permit Reissued January 20, 2004									
10/26/04	Chronic *C. dubia*	~~>100~~	~~>100~~	**INV**	~~100~~		~~1~~		Control Survival 30%
10/26/04	Chronic *P. promelas*	~~>100~~	~~>100~~	**INV**	~~93~~		~~1~~		PMSD 37%
11/09/04	Chronic *C. dubia*	>100	>100	100 SR	100		1		1st annual
11/09/04	Chronic *P. promelas*	~~>100~~	~~>100~~	**INV**	~~78~~		~~1~~		PMSD 47%
11/30/04	Chronic *P. promelas*	>100	>100	100 SG	85		1		1st annual
07/28/05	Chronic *C. dubia*	>100	>100	100 SR	90		1		2nd annual
07/28/05	Chronic *P. promelas*	>100	>100	100 SG	83		1		
05/08/07	Chronic *C. dubia*	>100	>100	100 SR	100		1		4th annual
05/08/07	Chronic *P. promelas*	>100	>100	100 SG	100		1		
04/29/08	Chronic *C. dubia*	>100	>100	100 SR	100		1		5th annual
04/29/08	Chronic *P. promelas*	>100	>100	100 SG	95		1		

TEST DATE	TEST TYPE/ORGANISM	48-h LC_{50} (%)	IC_{25} (%)	NOEC	% SURV	TU_a	TU_c	LAB	REMARKS
Permit Reissued 1 June 2009									
06/02/09	Chronic *C. dubia*	>100	>100	100 SR	100		1	EA	Extra test
06/02/09	Chronic *P. promelas*	>100	>100	100 SG	100		1		
06/17/10	Chronic *C. dubia*	>100	>100	100 SR	100		1	EA	1st Annual
05/18/10	Chronic *P. promelas*	>100	>100	100 SG	100		1		
04/28/11	Chronic *C. dubia*	>100	>100	100 SR	100		1	EA	2nd Annual
04/05/11	Chronic *P. promelas*	>100	>100	100 SG	100		1		
05/08/12	Chronic *C. dubia*	>100	>100	100 SR	100		1	EA	3rd Annual
05/08/12	Chronic *P. promelas*	>100	>100	100 SG	100		1		
06/25/13	Chronic *C. dubia*	>100	>100	100 SR	100		1	EA	4th Annual
06/25/13	Chronic *P. promelas*	>100	>100	100 SG	95		1		

FOOTNOTES:

A boldfaced LC50 or NOEC value indicates that the test failed the toxicity criterion.
LC50 based on observation at the end of 48 hours.

ABBREVIATIONS:

S – Survival; R – Reproduction; G – Growth
INV – Invalid test
% SURV – Percent survival in 100% effluent
EA – EA Engineering, Science, and Technology

ATTACHMENT 19

Statistical Analysis of Previous WET Results

3/21/2014 4:20:15 PM

Facility = Alexandria Renew Enterprises
Chemical = Toxicity - C. dubia
Chronic averaging period = 4
WLAa = 3.1
WLAc = 2
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 5
Expected Value = 1
Variance = .36
C.V. = 0.6
97th percentile daily values = 2.43341
97th percentile 4 day average = 1.66379
97th percentile 30 day average= 1.20605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1
1
1
1
1

3/21/2014 4:20:55 PM

Facility = Alexandria Renew Enterprises
Chemical = Toxicity - P. promelas
Chronic averaging period = 4
WLAa = 3.1
WLAc = 2
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 5
Expected Value = 1
Variance = .36
C.V. = 0.6
97th percentile daily values = 2.43341
97th percentile 4 day average = 1.66379
97th percentile 30 day average= 1.20605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1
1
1
1
1

ATTACHMENT 20

Calculated Compliance Endpoints for WET Requirements

Spreadsheet for determination of WET test endpoints or WET limits

	Excel 97			Acute Endpoint/Permit Limit			Use as LC_{50} in Special Condition, as TUa on DMR							
	Revision Date: 12/13/13													
	File: WETLIM10.xls			ACUTE	100% =	NOAEC	LC_{50} =	NA	% Use as	NA	TUa			
	(MIX.EXE required also)													
				ACUTE WLAa		0.30642444	Note: Inform the permittee that if the mean of the data exceeds							
							this TUa:	1.0	a limit may result using STATS.EXE					
				Chronic Endpoint/Permit Limit			Use as NOEC in Special Condition, as TUc on DMR							
				CHRONIC	2.97875544	TU_c	NOEC =	34	% Use as	2.94	TU_c			
				BOTH*	3.06424452	TU_c	NOEC =	33	% Use as	3.03	TU_c			
	Enter data in the cells with blue type:			AML	2.97875544	TU_c	NOEC =	34	% Use as	2.94	TU_c			
	Entry Date:	03/21/14		ACUTE WLAa,c		3.06424444		Note: Inform the permittee that if the mean						
	Facility Name:	Alexandria Renew		CHRONIC WLAc		2.03665185		of the data exceeds this TUc:			1.22410367			
	VPDES Number:	VA0025160		* Both means acute expressed as chronic				a limit may result using STATS.EXE						
	Outfall Number:	1		% Flow to be used from MIX.EXE				Diffuser /modeling study?						
	Plant Flow:	54	MGD					Enter Y/N	n					
	Acute 1Q10:	59	MGD	1.96	%			Acute	1	:1				
	Chronic 7Q10:	59	MGD	94.88	%			Chronic	1	:1				
	Are data available to calculate CV? (Y/N)			N	(Minimum of 10 data points, same species, needed)						Go to Page 2			
	Are data available to calculate ACR? (Y/N)			N	(NOEC<LC50, do not use greater/less than data)						Go to Page 3			
	IWC_a	97.90341647	%	Plant flow/plant flow + 1Q10			NOTE: If the IWCa is >33%, specify the							
	IWC_c	49.10019349	%	Plant flow/plant flow + 7Q10			NOAEC = 100% test/endpoint for use							
	Dilution, acute	1.021414815		100/IWCa										
	Dilution, chronic	2.036651852		100/IWCc										
	WLA_a	0.306424444	Instream criterion (0.3 TUa) X's Dilution, acute											
	WLA_c	2.036651852	Instream criterion (1.0 TUc) X's Dilution, chronic											
	$WLA_{a,c}$	3.064244444	ACR X's WLA_a - converts acute WLA to chronic units											
	ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)											
	CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)											
	Constants eA	0.4109447	Default = 0.41											
	eB	0.6010373	Default = 0.60											
	eC	2.4334175	Default = 2.43											
	eD	2.4334175	Default = 2.43 (1 samp)	No. of samples	1		**The Maximum Daily Limit is calculated from the lowest							
							LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.							
	$LTA_{a,c}$	1.259235014	WLAa,c X's eA											
	LTA_c	1.22410373	WLAc X's eB								Rounded NOEC's		%	
	MDL** with $LTA_{a,c}$	3.06424452	TU_c	NOEC =	32.634471	(Protects from acute/chronic toxicity)					NOEC =	33	%	
	MDL** with LTA_c	2.978755439	TU_c	NOEC =	33.571068	(Protects from chronic toxicity)					NOEC =	34	%	
	AML with lowest LTA	2.978755439	TU_c	NOEC =	33.571068	Lowest LTA X's eD					NOEC =	34		
	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU to TU_a													
											Rounded LC50's		%	
	MDL with $LTA_{a,c}$	0.306424452	TU_a	LC50 =	326.344714	%	Use NOAEC=100%				LC50 =	NA	%	
	MDL with LTA_c	0.297875544	TU_a	LC50 =	335.710675	%	Use NOAEC=100%				LC50 =	NA		

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data		Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********			**********	
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA	NEED DATA
Mean	0	0	Mean	0	0
Variance	0	0.000000	Variance	0	0.000000
CV	0		CV	0	

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA
(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929668

eA = 0.410944686

Using the log variance to develop eB
(P. 100, step 2b of TSD)

δ_4^2 = 0.086177695

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC
(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD
(P. 100, step 4b of TSD)

n = 1 This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

Table 3. ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC_{50}, enter it here: NO DATA %LC_{50} / NO DATA TUa

DILUTION SERIES TO RECOMMEND

Table 4.	Monitoring % Effluent	Monitoring TUc	Limit % Effluent	Limit TUc
Dilution series based on data mean	81.7	1.224104		
Dilution series to use for limit			34	2.9411765
Dilution factor to recommend:	0.9038386		0.5830952	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	90.4	1.11	58.3	1.71
	81.7	1.22	34.0	2.94
	73.8	1.35	19.8	5.04
	66.74	1.50	11.6	8.65
Extra dilutions if needed	60.32	1.66	6.7	14.84
	54.52	1.83	3.9	25.44

Cell: I9
Comment:
This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

ATTACHMENT 21

Public Notice

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body and allow the reuse of reclaimed wastewater in the City of Alexandria, Virginia.

PUBLIC COMMENT PERIOD: January 16, 2015 to February 16, 2015

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: City of Alexandria, Virginia Sanitation Authority
d/b/a Alexandria Renew Enterprises
1500 Eisenhower Avenue, Alexandria, VA 22314
VA0025160

This facility is an Extraordinary Environmental Enterprise participant in Virginia's Environmental Excellence Program.

PROJECT DESCRIPTION: City of Alexandria, Virginia Sanitation Authority d/b/a Alexandria Renew Enterprises has applied for a reissuance of a permit for the public Alexandria Renew Enterprises Water Resources Recovery Facility. The applicant proposes to release treated sewage wastewaters from residential areas at a rate of 54 million gallons per day into a water body and reuse reclaimed wastewater for landscape water features and non-bulk irrigation. Biosolids from the treatment process will be land applied and/or blended in the production of a soil amendment. The facility proposes to release the treated sewage in the Hunting Creek in City of Alexandria in the Potomac River watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: pH, carbonaceous-biochemical oxygen demand, total suspended solids, dissolved oxygen, ammonia, E. coli, nitrate+nitrite, total nitrogen, total phosphorus and total residual chlorine. The facility will be required to monitor for total Kjeldahl nitrogen and whole effluent toxicity.

Additionally, the facility maintains a pretreatment program in accordance with Part VII of 9VAC25-31. The Industrial Pretreatment Plan for Continuous Industrial Waste Survey and the significant industrial user permit boilerplate have been updated.

This facility is subject to the requirements of 9VAC25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by hand-delivery, email, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the draft permit and application at the DEQ-Northern Regional Office by appointment or may request electronic copies of the draft permit and fact sheet.

Name: Douglas Frasier
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3873 Email: Douglas.Frasier@deq.virginia.gov Fax: (703) 583-3821

ATTACHMENT 22

State/Federal Agency Comments

Frasier, Douglas (DEQ)

From: ProjectReview (DGIF)
Sent: Thursday, January 23, 2014 1:33 PM
To: Aschenbach, Ernie (DGIF); Frasier, Douglas (DEQ); nhreview (DCR); Hillman, Brett; David O'Brien - NOAA Federal
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: RE: ESSLog 33709; VPDES reissuance VA0025160 City of Alexandria Virginia Sanitation Authority SANUP, VA

Correction in red below. This edition supersedes and should replace the original.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
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From: Aschenbach, Ernie (DGIF)
Sent: Thursday, January 23, 2014 1:21 PM
To: Frasier, Douglas (DEQ); nhreview (DCR); Hillman, Brett; David O'Brien - NOAA Federal
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF)
Subject: ESSLog 33709; VPDES reissuance VA0025160 City of Alexandria Virginia Sanitation Authority SANUP, VA

We have reviewed the application for VPDES reissuance for the above-referenced facility. The receiving water for outfall 001 is Hunting Creek, for outfall 002 is Hooff Run. According to the application (all critical flows for receiving waters) these are tidal waters. ~~The receiving water flow is 0.0 million gallons per day (MGD).~~ The Design Flow of the facility is 54 MGD with an average flow of approximately 35 MGD.

According to our records Hunting Creek and Hooff Run are headwater tributaries to the Potomac River, a confirmed anadromous fish use river. In general, when water is treated we typically recommend and support ultraviolet (UV) disinfection (rather than chlorination disinfection) and support the continued dechlorination of effluent after chlorine disinfection. Provided the applicant adheres to the effluent characteristics identified in the permit application, we do not anticipate the issuance of this permit to result in adverse impact to anadromous fish use waters or their associated species.

This project is located within 2 miles of a documented occurrence of a state or federal threatened or endangered plant or insect species and/or other Natural Heritage coordination species. Therefore, we recommend and support coordination with VDCR-DNH regarding the protection of these resources. We also recommend contacting the USFWS regarding all federally listed species.

Thank you for the opportunity to provide comments. Please call me if you have any questions.

Ernie Aschenbach
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Frasier, Douglas (DEQ)

From: Hillman, Brett [brett_hillman@fws.gov]
Sent: Tuesday, November 12, 2013 3:16 PM
To: Frasier, Douglas (DEQ)
Subject: Re: Alexandria Renew Enterprises - VA0025160

Thanks for sending this along. Everything looks good, so I have no further comments! Thanks for bearing with me.

Best,
Brett

Brett Hillman
Fish and Wildlife Biologist
U.S. Fish & Wildlife Service
Virginia Field Office
6669 Short Lane
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Email: brett_hillman@fws.gov

"Working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people"

On Tue, Nov 12, 2013 at 12:45 PM, Frasier, Douglas (DEQ) <Douglas.Frasier@deq.virginia.gov> wrote:

Brett,

I've attached the reported TN and TP loads for 2012. Alexandria is listed as Alexandria SA WWTP and can be found on page 3 for TN and page 5 for TP. The plant is currently under their WLA for nitrogen as reported for 2012 and it appears on track for 2013. Per the nutrient regulations, the plant must either meet the WLA or purchase excess credits on the exchange from other facilities that discharged less than their allocations – essentially there is no increase in the aggregate for this watershed. Since they are meeting their WLA, there would be no justification for a compliance schedule and is not anticipated with the final/future upgrades.

Doug

Douglas Frasier
VPDES Permit Writer, Senior II
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Regional Toxics Management Program Coordinator
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From: Hillman, Brett [mailto:brett_hillman@fws.gov]
Sent: Tuesday, November 12, 2013 11:40 AM

To: Frasier, Douglas (DEQ)
Subject: Re: Alexandria Renew Enterprises - VA0025160

Hi Doug,

I have one more question before I can close the book on reviewing this permit. Is the plant currently meeting its WLA of 493,381 lb/year for Total Nitrogen as set forth in the Water Quality Management Plan Regulation, 9 VAC 25-720-50-C? Or will it need to decrease the Nitrogen concentration in its effluent from 6 mg/L to 3 mg/L just to get to that point? If that is the case, could this be the type of situation for which a compliance schedule is feasible?

Thanks!

Brett

Brett Hillman

Fish and Wildlife Biologist

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On Thu, Nov 7, 2013 at 4:27 PM, Hillman, Brett <brett_hillman@fws.gov> wrote:

Right, that would be it. I didn't even consider that! Thanks for figuring it out.

Brett

Brett Hillman

Fish and Wildlife Biologist

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On Thu, Nov 7, 2013 at 4:14 PM, Frasier, Douglas (DEQ) <Douglas.Frasier@deq.virginia.gov> wrote:

Brett,

The ammonia criteria have changed slightly since the last reissuance, so that could explain the difference you are finding.

Doug

From: Hillman, Brett [mailto:brett_hillman@fws.gov]
Sent: Thursday, November 07, 2013 4:08 PM

To: Frasier, Douglas (DEQ)
Subject: Re: Alexandria Renew Enterprises - VA0025160

Hi Doug,

Thanks for the quick and very detailed responses! I appreciate your time. There is one thing I'm still not clear on, and I'm sure it's because I'm missing something obvious. In the attachment you included in your previous email, the 90% values for temp and pH are 17.6 degrees and 7.5 SU, respectively. However, when I plug these numbers into the ammonia tables in the Virginia Water Quality Standards (http://water.epa.gov/scitech/swguidance/standards/wqslibrary/upload/vawqs.pdf), I get different values than the ones highlighted in the attachment. Am I missing a step in the process somewhere?

Thanks again,

Brett

Brett Hillman

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On Thu, Nov 7, 2013 at 3:46 PM, Frasier, Douglas (DEQ) <Douglas.Frasier@deq.virginia.gov> wrote:

Brett,

I've copied your questions and provided answers below each one:

- According to the fact sheet, "This facility was identified in the TMDL as a potential source of PCBs." I see that PCBs are monitored, but not limited. Why is that?

Under that TMDL, all major facilities and any other potential sources were required to monitor to ascertain if they were indeed a source. Each municipal discharger monitored 2 dry weather and 2 wet weather events during their respective permit term. We will be using this data to determine what facilities will need to conduct a source reduction program (implementation portion of the TMDL).

- Where did the acute and chronic criteria for ammonia on page 8 of the fact sheet (i.e. 33 mg/L for acute and 9.2 mg/L for chronic from Nov. - Jan.) come from in the determination of the WLAs? I played around with the temp and pH data in the appendix and the ammonia tables in the Virginia Water Quality Standards, but I didn't arrive at the numbers in the chart on page 8.

Please see attached. This is the spreadsheet that you may have come across in the Attachments that we use to calculate the various WLAs. The ammonia criteria and WLAs are highlighted on the first page. The pH value used for that specific time period was slightly different, which would account for the difference from the April – October time frame.

- Why are early life stages absent in winter months although they're present in the summer months? I'm guessing this is a standard thing, but just wanted to make sure.

This assumption reflects the limitations found in the Potomac Embayment Standards; ammonia limitations applicable April 1 – October 31st for sewage treatment plants.

- What can you tell me about this:

The facility is currently in the midst of upgrading the existing infrastructure and installing additional process units as part of a two-phased approach to ultimately achieve a Total Nitrogen (TN) annual average concentration of 3 mg/L as set forth in the Water Quality Management Plan Regulation, 9 VAC 25-720-50-C.

In the interim, it is proposed that an annual average TN concentration of 6 mg/L be proposed. This is based on the existing plant configuration/operation, recent upgrades and the best engineering assessment concerning the attainable level of treatment during construction. Further upgrades will insure a reliable level of treatment required to meet the WLA of 493,381 lb/year for Total Nitrogen (3 mg/L annual average) at the 54 MGD design flow. These limitations will become effective January 1st following issuance of the CTO upon completion of construction.

During the last permit cycle, the facility installed and brought online a methanol storage/feed station to enhance the ability to denitrify; thus further lowering the total nitrogen level in the effluent. The methanol is a carbon source for the bacteria in order to convert the nitrate portion within the waste stream to nitrogen gas. The facility is currently finishing the installation of a sixth biological reactor basin to enhance further treatment for nitrogen. In addition, a new Centrate Pretreatment Facility will also be brought online that will treat the centrate from the biosolids treatment units. This process will reduce the ammonia levels being returned to the system. In 2016, in is projected that a new Nutrient Management Facility will be brought on line. This process unit will serve as 'holding' tanks for effluent when ammonia levels are at their highest so that the operators can bleed in the higher concentrations at a later time to help level out the spikes and have a more consistent treatment process.

Is the facility now limited to an annual average of 3 mg/L TN? Did this go into effect when it was supposed to?

Not at this time. As noted previously, all upgrades were not completed during this past permit term.

Hopefully I answered your questions for you, but if not let me know.

Best regards,

Doug

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